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## TRADE AND SERVICES

## No. 1219

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INTERNATIONAL ECONOMIC RELATIONS

# ON COOPERATION IN THE REALM OF PLANNING ACTIVITY FOR CEMA-MEMBER STATES

Tashkent EKONOMIKA I ZHIZN' in Russian No 8, Aug 79 pp 20-25

[Article by N. Baybakov, Deputy Chairman of the USSR Council of Ministers, Chairman of USSR Gosplan, Chairman of the CEMA Committee on Cooperation in the Realm of Planning Activity]

[Text] Reprinted from the magazine EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 2, 1979.

The creation in 1949 of the Council for Mutual Economic Assistance [CEMA] was an event of truly historic importance. Within the framework of the world's first organization of socialist countries there have been developed and implemented those methods and forms of mutually advantageous ties which make it possible to use to the fullest extent the advantages of the international socialist division of labor, of intergovernmental economic relations of a new, socialist type.

The growing production potential of the CEMA member countries, and the achievements in the field of science and technology, make it possible today to resolve the large-scale tasks in various fields of the economy, and to strive for the steady rise in the standard of living in every country individually, and in the community as a whole.

With the upsurge in the economy of the CEMA member countries there has been an expansion and deepening of the cooperation among them, and particularly in the area of planning activity, and the mechanism of cooperation has been improved. In 1958, at the 9th Meeting of the CEMA Session, a Permanent Commission on Economic Questions was formed. The commission consisted of delegations from the countries, headed by the deputy chairmen of the central planning agencies. The commission carried out the guidance of the work involving the methodology of planning and the comparison of the cost indices, the development of its own price base, the comparison of the levels of labor productivity and production costs in the CEMA member countries. As a working agency, the Permanent Commission had a conference of directors of scientific-research and economic institutes.

The 16th (Extraordinary) Meeting of the Council Session (1962) adopted a decision to form an additional agency -- the Bureau of the CEMA Executive Committee for Composite Questions in Economic Plans. In addition to the development of the forms and methods of bilateral and multilateral coordination of the national plans, it engaged in questions of forecasting the basic trends in the upsurge of the countries' economy and the joint planning of individual branches of industry and types of production entities, and prepared materials for the CEMA Executive Committee for the coordination of the national-economic plans for the next five-year period.

An important stage in the development of cooperation among the CEMA member countries was the 23rd (Special) Council Session, which was held at the level of leaders of the fraternal parties and governments. Emphasizing the tremendous political importance of the complete development of the economic ties among the fraternal countries, the Session participants stated, "The cooperation among the socialist states which are welded together by the commonality of the fundamental class interests and goals and which are guided by the single ideology of Marxism-Leninism, must rely upon a system of solid and stable international socialist division of labor which guarantees the close interaction of the national economies of the CEMA member countries."

The course adopted at the Session meant that cooperation within the framework of the CEMA is rising to a new and higher level. The fundamental long-term goals that were developed at the 23rd (Special) Meeting of the Session formed the basis of the Comprehensive Program for the Further Deepening and Improvement of Cooperation and Development of the Socialist Economic Integration of the CEMA Mmeber Countries, which was unanimously adopted at the 25th Meeting of the CEMA Session in 1971.

The Comprehensive Program confirmed the stability of the principles of socialist internationalism which form the basis of the Council's activities; respect for the state sovereignty, independence, and national interests; noninterference in the internal affairs of the countries; their completely equal rights; mutual advantage and comradely mutual aid. The development of socialist economic integration is not accompanied by the creation of supranational agencies.

The adoption of the Comprehensive Program contributed to the further expansion and deepening of the cooperation in the area of planning activity. It is being developed in the following directions:

-- the development of forecasts in the most important areas of the economy, science,and technology;

-- the coordination of plans for the prolonged future for the most important branches and types of production entities;

-- the further improvement of the coordination of the five-year plans for the development of the national economy;

-- the joint planning, by the interested countries, of individual branches of industry and types of production entities;

-- the exchange of experience among the CEMA member countries with regard to improving the systems of planning and control of the national economy.

The CEMA member countries also agreed to carry out joint consultative meetings dealing with the basic problems in the economic and scientific-technical policy. They promote the creation of more favorable conditions for the further development of the international socialist division of labor; the working out of a coordinated strategy for the CEMA member countries for resolving the key national-economic problems; the accelerated development of the economies of the industrially less-developed countries.

A new major step in improving the mechanism of the mutually advantageous and highly effective ties among the fraternal countries, a step which created the necessary organizational prerequisites for the expansion and deepening of those ties, was the formation, on the basis of a decree by the 25th Meeting of the Session of the Council, of the CEMA Committee on Cooperation in the Realm of Planning Activity, on the level of the chairmen of the central planning agencies. As is indicated in the corresponding Statute, which was approved by the CEMA Executive Committee, the new agency has the purpose of promoting the further development of the economic relations among the countries that are members of the Council, and primarily in the area of planning activities, which relations are aimed at the implementation of the Comprehensive Program; and of promoting the more intensive growth of the national economy of the industrially less-developed countries and assuring the effective participation of the countries' central planning agencies in that cooperation.

The chief task of the Committee is to ascertain the most important problems of cooperation in the basic areas of the economy and their comprehensive solution on a multilateral basis, primarily for the purpose of satisfying the needs of the CEMA member countries for energy, fuel, and raw materials; the introduction of advanced technological processes into production; the development and organization of the production of new types of modern machinery and equipment; as well as the development of transportation ties.

In this regard, the sessions of the Committee considered the basic trends in the economic development and cooperation of the CEMA member countries for the extensive long-term period and for the five-year periods, the gradual equalization of the levels of their economies, the upsurge of the fuel and energy branches, including the problems of constructing nuclear electric-power stations and the production of energy equipment, the development of a raw-materials base for ferrous and nonferrous metallurgy and the chemical industry, and other questions pertaining to economic relations. The decisions adopted by the Committee are taken into consideration when development the national-economic plans for the individual countries.

One of the most important functions of the Committee, a function which has been widely developed in recent time, is the development -- or the organization of the development on the basis of recommendations and decisions of the CEMA agencies and the Committee itself -- of the draft versions of the multilateral agreements among the CEMA member countries with regard to the most important problems of cooperation in the sphere of material production, as well as the promotion of the simultaneous preparation of bilateral agreements concluded by the countries for purposes of implementing multilateral agreements.

Carrying out a considerable amount of work to promote the resolution of the major comprehensive problems of economic cooperation, the Committee considered and approved a number of general agreements that are linked with the construction of projects by the joint efforts of the countries in the fuel-energy and raw-materials branches. In this regard, greater and greater importance in the work of the Committee has been attached to questions of coordinating the capital investments to be channeled by the countries into the projects involved in the cooperation.

The Committee also accepts methodological and program documents dealing with cooperation, which serve as the basis for developing the appropriate materials in the individual branches of the national economy. It carries out the systematic monitoring of the implementation by the countries of the recommendations that were developed by them, and takes steps to promote their execution.

Within the confines of the Committee, a large amount of work is done with regard to the methodological guidance of questions of planning the cooperation on the part of the CEMA agencies, as well as the international economic organizations.

The Committee works in close contact with the other committees, as well as the permanent commissions and other agencies of the CEMA, and coordinates with them the development of related questions, primarily forecasts, joint planning, the coordination of the five-year plans, and the development and implementation of long-term specially-earmarked programs for cooperation.

The Committee has as working agencies:

-- the Committee Bureau, made up of deputy chairmen of the state planning agencies. They prepare materials for consideration by the Committee, and for a number of questions make independent decisions. The accords that are achieved within the confines of the Bureau are implemented by the competent agencies in the countries in accordance with the procedure established there. Within the framework of the Bureau there are permanent working groups on the fuel-energy balance sheet and cooperation in the area of forecasting.

-- the Conference of Deputy Chairmen of the State Planning Agencies and other competent agencies of the countries which are in charge of questions involving the improvement of planning and administration of the national economy. The task of the Conference is to generalize the methodological materials employed in the countries in the area of forecasting, the system of national-economic plans, the planning of capital investments, multilateral integrational measures, etc.

One of the basic trends in the Committee's activities is the forecasting of the development of the national economies of the CEMA member countries.

The Working Group on Cooperation in the Area of Forecasting the General Economic Indicators, which was created within the framework of the Committee Bureau, generalized the materials that had been prepared within the national framework, and drew up a forecast for the development of the national economies of the CEMA member countries until 1995. Appropriate documents were prepared in the area of the production and consumption of the basic types of fuel, raw materials, energy, and metals, and particularly those pertaining to the extent to which the CEMA member countries are provided with prospected reserves of the basic mineral resources until 1990-2000.

Work was carried out to compute the forecasted reserves of petroleum and gas in the countries, including the deep-seated deposits in the adjacent regions of the continental shelf of the world's oceans.

In electrical engineering, plans were made for the basic trends in the long-term development of the United Electric-Energy Systems until 1990; ways were ascertained to satisfy the economically substantiated needs of the CEMA countries of Yugoslavia for electric energy; ways were determined for the more complete use of the countries' own fuel and hydroelectric resources for the production of electric energy; etc.

At all stages in the work, the problems that were brought to the forefront were the most promising ones, those that determine the technical progress. An example of this can be provided by the attention that was devoted to the development of nuclear power engineering for the period until 1990. What is under consideration here is not only the scope of the measures set down in each of the countries, but also the unification of the efforts and the division of labor within the confines of the CEMA. For this purpose, a determination was made of the role played by nuclear power stations in satisfying the countries' needs for electric energy, and other cardinal questions were worked out.

All this played an important role in coordinating the national-economic plans for 1976-1980 and created the prerequisites for the successful and fruitful work of coordination for 1981-1985, and, for individual problems of a particularly crucial nature, for an even longer time period.

An important sector in the Committee's activities is the exchange of experience in improving the systems of planning and administration of the national economy. As is well known, in the course of developing national centralized planning in the socialist countries, broad use was made of the experience gained by the Soviet Union. Subsequently that exchange became reciprocal.

At the present time, provision is made for approximately ten major topics for which the countries exchange materials. They include topics which deal with the reciprocal coordination of long-term, medium-term, and annual plans, their coordination in physical and monetary terms, topics dealing with the role and place of comprehensive programs in the system of planning and administration, methods of planning the most important integrational measures in connection with the development of a Coordinated Plan, etc.

The exchange of experience helps to give the national-economic plans a more comprehensive nature, to increase their directedness at the complete intensification and the further increase in the effectiveness of production and the improvement of the quality of output; it promotes the use of qualitative factors to substantiate the balance-sheet settlements and, in the final analysis, the more complete reflection of the economic indices for the development of socialist economic integration in state plans.

A special place in the activities of the Committee is occupied by the coordination of the state plans on a bilateral and multilateral basis with regard to the most important branches of the national economy and types of production entities. The changeover in 1954 to this form marked a higher and more complex stage in the development of cooperation in the area of planning activities.

The coordination of medium-term and long-term national-economic plans is a new phenomenon in international economic relations, and a socialist method of expanding and deepening the international division of labor. It is based on the use of the advantages of the new social system.

When coordinating the plans, the CEMA member countries proceed from the fact that planning for a prolonged long-term period, noting the basic tendencies in the development of the most important branches of the economy and types of production entities for 10-20 years, determines the program for medium-term (five-year) planning also for the participation of the countries in the international socialist division of labor. Therefore the coordination of the five-year plans is viewed as one of the basic methods for the planned development of cooperation and as one of the chief means for forming stable economic and scientific-technical ties within the framework of the CEMA. It lies in the generalization and coordination of the basic trends in the production ties among the countries, in the solution of the question of the reciprocal shipments of the basic types of industrial and agricultural output for the forthcoming period.

When coordinating the plans for the current five-year period, the work in the CEMA member countries was concentrated on the development of the cardinal tasks of economic and scientific-technical cooperation that were stipulated by the Comprehensive Program, as well as the problems that were additionally advanced by the countries.

Coordination for 1976-1980 was carried out both on a multilateral basis -- within the framework of the CEMA Committee on Cooperation in the Realm of Planning Activity -- and on a bilateral basis -- between the planning and economic agencies in the individual countries. As a result, in addition to the protocols dealing with the coordination of the plans and the intergovernmental trade agreements for the five-year plan, the appropriate countries signed a number of multilateral and bilateral agreements dealing with the providing to the countries of fuel-energy and raw-material resources and, in this regard, the effective unification of their efforts and means for the joint development of the corresponding branches, as well as the expansion of intergovernmental specialization and cooperation of production in the most important branches of the economy, etc.

At the present time the CEMA member countries are carrying out the coordination of their plans for 1981-1985. A typical feature of the modern stage lies in the fact that the now traditional questions of production cooperation are being resolved in a comprehensive manner with a consideration of the long-term specially-earmarked programs, in which there is a reflection of the coordinated strategy of cooperation in the appropriate branches of material production for the prolonged long-term period.

Chairman of the USSR Council of Ministers Comrade A. N. Kosygin, at the 32rd Meeting of the CEMA Session, said in this regard, "At the present time in the CEMA countries there is extensive preparation of the national-economic plans for 1981-1985. For the successful solution of the tasks of socioeconomic development in the forthcoming five-year period, we shall have to make more complete use of the possibilities of joint cooperation which are opened up by the long-term specially-earmarked programs; we shall have to coordinate more closely the measures set down in them with the individual national plans and with the programs for specialization and cooperation of production which are being developed on a bilateral basis.

"The coordination of the national-economic plans, the preparation of the agreeements governing the implementation of the adopted long-term programs must be organized in such a way that they can serve as guide lines for the economic policy being developed by the fraternal parties for the next congresses -- the policy for 1981-1985 and for the subsequent period."

Constantly improving the forms of multilateral cooperation, the Committee developed, and the 29th Meeting of the Council Session (1975) approved, the Coordinated Plan for Multilateral Integrational Measures for 1976-1980. The need for multilateral planning in this area evolves from the Comprehensive Program, most of the measures in which are of a multilateral nature and, consequently, need the corresponding coordination. That document, which is of great political and economic importance, provides for the carrying out of the most large-scale and most long-range measures in the area of the foreign-economic ties among the countries in the socialist community.

In conformity with the Coordinated Plan, the interested CEMA member countries are successfully resolving the most important tasks in the area of the fuel and raw-materials problems, particularly those involved in the construction of large-scale industrial projects whose output is needed by all the countries or by a group of countries; the increase in the effectiveness of capital investments; and also the development of specialization and cooperation of production, the development of scientific and technical problems, etc.

Everyone is familiar with the projects whose construction by joint efforts was planned by the central planning agencies in the countries and by the CEMA Committee on Cooperation in the Realm of Planning Activity. One example might be provided here by a project that is unique with regard to its technical-economic indices -- the Soyuz main gas pipeline, which runs from Orenburg to the western border of the USSR, and the entire complex of structures that are linked with its further operation, including the technological, economic, administrative, and auxiliary structures, and housing complexes.

Another project that has been activated is the high-tension electrical transmission line from Vinnitsa (USSR) to Albertirsa (Hungary). Designed and constructed by the interested countries, it is one of the few lines in the world with that voltage. With the aid of that transmission line at the 1980 level there will be a capabaility for the parallel operation of the power systems of the Council countries, with a capacity of 100,000 megawatts, and the power system of the western rayons of the USSR, with a capacity of 60,000 megawatts, and this will make it possible to create a united power system with a capacity of 160,000 megawatts and to achieve a considerable increase in the delivery of electrical energy from the USSR to the European CEMA member countries.

Taking into consideration the ever-increasing need for woodpulp in the countries, in conformity with a general agreement construction is under wat at the Ust'-Ilimskiy plant, with a capacity of 500,000 tons of sulfate woodpulp a year. After its activation, the appropriate countries for 12 years will annually receive an average of 50,000 tons each of this scarce product.

Construction is also successfully under way at other enterprises that were stipulated by the Coordinated Plan for 1976-1980.

At the present time work on the Coordinated Plan for 1981-1985 is under way within the confines of the Committee. The measures being considered in them include a series of steps to satisfy the additional needs of the CEMA member countries for raw materials containing iron and for metal, by means of creating on the territory of the Soviet Union, by the efforts and means of the CEMA member countries, of new iron-ore enterprises -- the Krivorozhskiy and Mikhaylovskiy (3rd phase) mining and concentration combines, the Yakovlevskiy Mine and the series of projects linked with it, as well as the large-scale metallurgical plant based on the Kursk Magnetic

Anomaly, with the purpose of expanding the shipments of output to the countries in the community.

An important role in developing socialist economic integration is played by the development by the Committee of long-term specially-earmarked programs for cooperation in the most important branches of material production. Three of them -- in the field of energy, fuel, and raw materials; agriculture and the food industry; and machine-building -- were approved at the 32nd Meeting of the CEMA Session in June 1978.

As the concrete expression and development of the Comprehensive Program, they pose tasks which, with regard to their scope and their long-term nature, are completely unprecedented in the practice of cooperation. Their resolution by the collective efforts of the countries in the socialist community will create favorable prerequisites for optimizing and increasing the effectiveness of the social production of the CEMA member countries, for increasing the volume of the worldwide socialist market, and will assure a stable growth in the reciprocal shipments of output.

According to preliminary computations, as a result of the implementation of the measures stipulated in the DTsPS [long-term specially-earmarked programs for cooperation] -- that is, the broad involvement in the economic circulation of each of the countries of its own resources, the economical and efficient use of those resources, the further development of production and scientific-technical cooperation -- the economically substantiated needs of the countries in the socialist economy as a whole for carriers of power will be 90-percent satisfied, and their need for iron-ore raw materials, ferrous metals, and nickel will be practically completely satisfied. There will be a considerable expansion of the opportunities for reciprocal shipments of modern machinery and equipment.

Proceeding from the principles of proletarian socialist integrationalism and fraternal mutual aid, the long-term specially-earmarked programs for cooperation provide for measures that promote the further development of the national economies of the Republic of Cuba and the Mongolian People's Republic and for increasing the effectiveness of their economies.

The long-term specially-earmarked programs for cooperation will become important components of the state plans for the economic and social development of the CEMA member countries for 1981-1985. The development of these programs on the eve of the next five-year period will make it possible to plan in the national plans a series of measures that are aimed at the further expansion of the countries' participation in the international socialist division of labor during that period, and for a number of problems, for an even longer period of time.

An important feature of the DTsPS is their relationship with the socioeconomic tasks posed by the parties and governments of the CEMA member countries with regard to socialist and communist construction. The implementation of these programs will promote the guaranteeing of stable rates of development of the economies in the CEMA member countries and the rise in the national standard of living.

Naturally, in the course of implementing the programs, their treatment of specific problems will be expanded, refined, and improved. However, even the present-day level of working out of the problems makes it possible to gain an idea of the real landmarks and contours of the economic development of the CEMA member countries for the long-term period, and to ascertain the most important tasks whose resolution is possible only by organizing multilateral cooperation.

An analysis of the DTsPS in the area of power, fuel, and raw materials indicates that the cooperation among the CEMA member countries has the capability of resolving this complicated problem on the basis of the close coordination of tha actions and the efficient use by each country of its material, financial, and labor resources. Special attention is given to the development of the most promising trends in cooperation. In this regard the program provides for measures involving the accelerated development of nuclear power engineering; the intensification of petroleum processing with the purpose of increasing the production of light petroleum products and the obtaining of motor fuel; the reduction of expenditure of fuel, raw materials, and energy when producing industrial output; etc.

The long-term specially-earmarked program for cooperation in the area of agriculture and the food industry was developed on the basis of the necessity for the intensive development of production in each of the CEMA member countries of the basic types of agricultural raw materials and foodstuffs. A large amount of attention is devoted to those types of output for which each country has at its disposal the most favorable natural and climatic conditions. For the resolution of this task, provision is made for the reinforcement of the material-technical base of agriculture by means of its further mechanization and chemicalization.

Plans have been made for the development of production and the expansion of export deliveries of sugar, fruit, vegetables, potatoes, cotton, fodder protein, amino acids, vitamins, and other commodities.

The successful fulfillment of the tasks that have been specified in these programs will, to a decisive degree, depend upon the expansion of the output and the more complete satisfying of the needs for machine technology in the appropriate branches.

For this purpose, in the corresponding sections of the DTsPS dealing with machine-building, provision has been made for measures to develop the international specialization and cooperation in the production of equipment for nuclear electric-power stations, for increasing the production and concentration of solid types of fuel, the thorough processing of petroleum, as well as progressive types of metallurgical equipment and complete units for the chemical industry.

It is planned to achieve the more complete satisfaction of the needs of agriculture for powerful tractors, for sets of the basic agricultural machinery and highly productive harvesting combines, and, the needs of the food industry for a number of types of technological equipment and automated production lines.

An important direction in the cooperation is the reorganization of machine-building itself on the basis of the achievements of worldwide scientific-technical progress. The processes involved here are the expansion of the production of automatic lines, of special and heavy-duty special-purpose machine tools, automated forge-press equipment, etc.

At the present time the Committee is continuing the preparation of the long-term specially-earmarked programs for satisfying the needs of the CEMA member countries for manufactured consumer goods, as well as for the development of the transportation ties among the CEMA member countries, including questions of provision with the necessary machinery, equipment, and materials, so as to submit these programs for the consideration of the 33rd Meeting of the Council Session.

The implementation of the long-term programs will be carried out chiefly by means of concluding multilateral and bilateral agreements. Some of them have already been signed and it is planned to sign others in the near future.

In conclusion I would like to note that the 30 years of experience in the cooperation among the CEMA member countries and our programs for the future completely confirm the vital force of the Marxist-Leninist principles of intergovernmental economic relations of the new type. These principles correspond to the objective needs of the socialist and communist construction in each fraternal country, and to the natural laws underlying the development of the worldwide socialist system, and promote the creation of a solid basis for broad and fruitful international cooperation.

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INTERNATIONAL ECONOMIC RELATIONS

## CEMA DEVELOPMENT REVIEWED

Moscow AGITATOR in Russian No 15, 1979 pp 50-53

[Article: "The Most Dynamic Force in the World"]

[Text] The Council for Mutual Economic Assistance -- the world's first collective organization of completely equal, multilateral, intergovernmental, economic cooperation -- has marked its thirtieth anniversary. The 33rd Jubilee Session of the Council which was held in Moscow on 26-28 June 1979 became an important landmark in its activities. It evaluated the road that has been traveled and set down new horizons for the further interaction among the fraternal countries. The jubilee session was a broad international forum. Its participants included representatives from 12 socialist countries, a number of other sovereign states on four continents, and also of authoritative international agencies.

"The social result of the development of the CEMA countries is one of the convincing proofs of the force of the international ideas of Marxism-Leninism, which, as is well known, from the very beginning were made the basis of the activities of the Council for Mutual Economic Assistance. Within the confines of the CEMA there was carried out for the first time in history the true democratization of international economic relations," Comrade L. I. Brezhnev emphasized in his message to the participants of the 33rd Session of the Council for Mutual Economic Assistance.

Approving the activities of the USSR delegation at the 33rd CEMA Session, the Politburo of the CPSU Central Committee and the USSR Council of Ministers placed a high evaluation on the documents adopted by the session -- the Statement Conerning the 30th Anniversary of CEMA and a communique -- which reflect the firm resolve of the fraternal socialist countries to continue to expand the complete cooperation that is based on the principles of socialist internationalism. Emphasis was made of the fundamental importance of the evaluations and conclusions contained in the message to the session by General Secretary of the CPSU Central Committee, Chairman of the USSR Supreme Soviet L. I. Brezhnev and the messages from the leaders of the other fraternal parties and states, for the further work of deepening the cooperation with the CEMA member countries, and for consolidating the unity and solidarity of the socialist community.

The CEMA member countries greeted their jubilee with new successes. They brilliantly attest to the fact that the socialist community has now become the most dynamic, most stable, most progressive economic force in the world.

## Indisputable Advantages of Socialism

The growth rates of national income and industrial output in the CEMA member countries throughout the period 1951-1978 were 3 times as high as in the developed capitalist countries. Thirty years ago the CEMA member countries produced 18 percent of the world's industrial output, and currently they are producing approximately one-third. Their share used to be 15 percent of the world's national income, and now it is 25 percent. The CEMA member countries are demonstrating in practice, by their specific achievements, the supremacy of the socialist system.

During the past three decades the production of industrial output per capita of population in the countries of the community increased by a factor of more than 8, at the same time that the average-world index during that period increased by a factor of only 3.2.

The industrial might of the CEMA member countries currently is greater than that of the United States or of all the countries of Western Europe, taken together.

The CEMA countries have only one-tenth of the world's population, but they produce almost every third ton of the steel produced in the world, two out of every five tons of mineral fertilizers, more than one-fourth of the metal-processing equipment, and are building approximately the same number of apartments as in the Common Market countries and the United States, taken together.

In their economic construction, the socialist countries have relied for many years upon the mighty industrial, natural, and scientific-technical potential of the USSR. The share of the Soviet Union is approximately 70 percent of the total production of industrial and agricultural output in the fraternal countries.

With the cooperation of the USSR, the CEMA countries have built or are building more than 2200 enterprises and other projects. Shipments of Soviet raw materials and fuel play an important role in guaranteeing the development of the economy of the fraternal states. Soviet shipments are carried out with terms that are considerably more advantageous for the fraternal states than those that exist on the world markets.

There has been a constant increase in the Soviet export of machinery and equipment to the countries in the community. During the current five-year plan this will enable them to resolve a number of major problems in the area of the development of power engineering, including nuclear, in metallurgy, and other branches of the economy.

The upsurge in the economy of the CEMA countries is based upon the high growth rates of capital investments in the national economy. As a whole, their volume increased by a factor of 10 in 1977 as compared with 1950. During the same period in Bulgaria it increased by a factor of 18; in Romania, 26; and in Mongolia, 73.

The volume of the produced national income in terms of per-capita population increased during the same period, for the CEMA countries as a whole, increased by a factor of 5.3. For individual countries (in 1978, as compared with 1950), it increased as follows: Bulgaria, by a factor of 8.5; Hungary, 4.1; East Germany, 6.5; Mongolia, 2.7; Poland, 5.1; Romania, 10; USSR, 5.6; and Czechoslovakia, 3.9.

The large and stable sales market in the Soviet Union makes it possible for the fraternal countries to develop machine-building successfully on a long-term planned basis, and encourages large-series production. From 1951 through 1977 Hungary increased the export of machine-building output to the USSR by a factor of 26; Poland, 41; Romania, 30; and Czechoslovakia, 33. Bulgaria, which previously had not had any machine-building, in 1955 delivered to the Soviet Union machinery and equipment valued at 5 million rubles, and in 1977, 1,236 million, or an increase of 247 times.

There has been an increase in the shipments from the fraternal countries of machinery and equipment and of other commodities. They are of substantial importance for the Soviet economy. For example, during the current five-year plan, the shipments from the Soviet Union's CEMA partners will provide for as much as 40 percent of Soviet needs for new ships and loaders; as much as 35 percent of railroad passenger cars; approximately one-third of metal-rolling equipment; and approximately one-half of the equipment for new automatic telephone stations. At least 15 percent of the assets of furniture, footwear, ready-to-wear clothing, and canned goods in Soviet retail trade are made up of commodities imported from the CEMA countries.

The adoption in 1971 of that important political document -- the Comprehensive Program for the Further Deepening and Improvement of Cooperation and the Development of the Socialist Economic Integration of the CEMA Member Countries -- determined the basic directions in the cooperation in the long-term view. The CEMA member countries are continuing to work on carrying it out. Its successful implementation is the chief political result of the activities of the CEMA during the past 30 years, and especially during the past decade.

The CEMA was created by countries with a dissimilar level of development, but, irrespective of their political and economic might and irrespective of the size of their population or the size of their territory, they received identical rights. Within an historically short period of time there have been eliminated, for the most part, the substantial differences in the levels of the economic development of the European CEMA countries. According to preliminary estimates, from 1950 through 1977 the gap in the levels of production, in per-capita terms, among these countries was reduced, for national income, from a factor of 3.2 to a factor of 1.3; and in industrial output, from a factor of 5 to a factor of 1.7.

## By Joint Efforts

It has become a well-established practice in fraternal cooperation to resolve important problems of economic development by means of the unification of resources. This kind of cooperation serves the common goals. The Druzhba petroleum pipeline, which is completely unique with regard to its capacity and length; the unification of the national electric-power systems of the European CEMA countries and the USSR; the development and production of modern computers in the single Ryad system; the cooperation among the CEMA member countries in the area of transportation and the common pool of railroad freight cars that has been created by them; the Institute of Nuclear Research in Dubna, which unites the efforts of the scientists of the socialist state in one of the leading trends of scientific-technical progress; the construction, by joint efforts, of such large-scale projects as the Ust'-Ilimskiy Woodpulp Plant and the Kiembayevskiy Asbestos Combine in the USSR, the Erdenet Copper and Molybdenum Combine in Mongolia, and nickel plants in Cuba; the program for construction with the technical assistance of the USSR in the European CEMA countries and in Cuba of nuclear electric-power stations with a total capacity of 37 million kilowatts -- those are only a few of the most important results of the close, fruitful cooperation among the CEMA member countries.

## The International Authority of the CEMA is Growing

The 33rd CEMA Session and the participation in its work of the representatives of a number of countries which are not members of the Council attest to the strengthening of the international authority of the Council for Mutual Economic Assistance, and to the consistency in the implementation of the course taken by the fraternal parties for the development of broad and completely equal cooperation with all states in the name of the consolidation of peace and the friendship of nations. In the Council for Mutual Economic Assistance, no one commands. "Our socialist community," Comrade L. I. Brezhnev notes, "is distinguished by the harmonious combination of national and international interests, by respect for the views and national peculiarities of every individual country. Therein certainly lies one of the reasons for the increasing authority of the CEMA." That faraway January day in postwar 1949 has already become part of history -- the day when the representatives of Bulgaria, Hungary, Poland, Romania, the Soviet Union, and Czechoslovakia gathered in Moscow and decided to create the Council for Mutual Economic Assistance. The Council which arose on the initiative of the Communist and workers parties now unites ten socialist states in Europe, Asia, and Latin America. Its composition has expanded. With the entry into the community of the Mongolian People's Republic (1962), the Republic of Cuba (1972), and the Socialist Republic of Vietnam (1978), the Council for Mutual Economic Assistance has become the organizer of the collective economic interaction of the socialist countries situated in various parts of the world.

With the broad support of the CEMA member countries, and particularly the Soviet Union, there has been an expansion of the base of modern industry in Cuba. The volume of its gross output from 1970 through 1978 increased by a factor of 1.7. With the aid of the USSR and the other socialist countries, new electric-power stations have been built on the Island of Freedom, and there has been a considerable increase in the capacity of those that were previously built. Thanks to this fact, the production of electric energy in 1978 reached 865 kilowatt-hours per capita of population.

The CEMA countries render all kinds of support to the fraternal Vietnamese people in the development of their socialist economy, the construction of important projects for the national economy, the restoration of enterprises that were destroyed by the Chinese aggressors, and also in the training of cadres of qualified specialists. The jubilee session adopted a decision to extend the the SRV [Socialist Republic of Vietnam] the fundamental principles of the Comprehensive Programs with regard to special measures to accelerate the development of its economy, as was done with regard to the Mongolian People's Republic and the Republic of Cuba.

Yugoslavia and Finland are cooperating with CEMA, and ties with Iraq and Mexico are being developed. The CEMA member countries are actively developing economic ties with Laos, Angola, and Ethiopia. By executing their international duty, they are providing them with support in the development of their economy. New testimony of the international influence of the CEMA has been the granting to it in 1974 of the status of observer at the General Assembly of the United Nations, as well as in certain regional commissions of the United Nations.

The CEMA today maintains regular ties with almost 30 international organizations, and with 60 different intergovernmental associations. It cooperates with 75 developing countries, to which it has rendered or is continuing to render aid in the construction of more than 3000 projects.

At the 33rd CEMA Session, confirmation was given of the readiness on the part of the CEMA and the council's member countries to conclude an agreement with the European Economic Community with with the EEC member countries on the basis of complete equality between the two sides in the interests of general European cooperation.

In response to the request from the government of the People's Democratic Republic of Yemen, the session adopted a decision concerning the participation of Yemen in the work of the CEMA as an observer.

The steady rise in the international authority of the CEMA is also attested to by the fact that the delegations participating in the jubilee session included delegations from Angola, Afghanistan, Iraq, the People's Democratic Republic of Yemen, Laos, Mozambique, Mexico, Finland, Ethiopia, as well as the executive secretary of the UN European Commission for Europe, a representative of the UN General Secretary, and the Executive Director of the United Nations for Industrial Development.

## New Stage of Cooperation

During the past 30 years a large number of glorious pages have been written by the CEMA countries into the further complete development of their national economy and the increase in the effectivenesss of social production. The multilateral cooperation in the main sphere of man's activities -- material production -- brought to life a network of international economic organizations in the CEMA member countries, which involve in the immediate cooperation the ministries, enterprises, and associations of various countries and which coordinate in an increasingly close manner their activities with the work of the CEMA agencies. The Council for Mutual Economic Assistance has been increasing the efforts involved in the further deepening of socialist economic integration, for the more complete satisfying of the material and spiritual needs of people -- the highest goal of the activities of all the fraternal Communist and workers parties.

The Moscow session of the CEMA planned majestic prospects. It developed a number of important tasks involving the improvement of the interaction among the CEMA member states. The unanimously adopted Statement Concerning the Thirtieth Anniversary of the Council for Mutual Economic Assistance expressed the high resolve of the CEMA participants to continue to expand and deepen the complete cooperation in the interests of the construction of socialism and communism, and thr einforcement of the might and solidarity of the community of fraternal nations. Long-range target programs for cooperation in satisfying the efficient needs of the CEMA member countries for manufactured consumer goods and for the development of transportation ties. Target programs have been prepared, to encompass the fuel-energy and raw-material branches, machine-building, agriculture, and the food industry. The rate of implementation of the long-range target programs for cooperation and coordination of the national-economic plans for 1981-1985 was also reviewed. Fourteen agreements were signed for the implementation of a number of measures stipulated by the long-range programs, including a large-scale agreement governing cooperation in the production of equipment for nuclear power stations. It is quite noteworthy that, in honor of the 30th anniversary of the CEMA, a competition among labor collectives has become widepread in our country and in the other fraternal coun-ries. Large masses of people are participating in creative labor, and the living ties that unite our people are becoming stronger and more numerous.

All the major achievements in the activities of the CEMA, in the carrying out of the Comprehensive Program, is the result of the tremendous mobilizing role of the CPSS and the Communist and workers parties of the countries in the socialist community. The development of the cooperation among the CEMA countries is carried out in the interests of universal peace.
The Charter of the Council, its keynote documents, and its practical deeds are completely imbued with the ideas of peace. As it enters the fourth decade of its existence, the Council for Mutual Economic Assistance continues to be an important factor in the deepening and materializing of the detente, in assuring stable peace and the friendship of peoples.

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## INTERNATIONAL ECONOMIC RELATIONS

# LONG-RANGE TARGET PROGRAMS FOR CEMA COOPERATION

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[Article by Yu. Pekshev]

[Text] The beginning of the fourth decade of the existence of the Council for Mutual Economic Assistance has been maked by an exceptionally important event -- the completion of the development of a series of long-range target programs for cooperation (LTPC) [in Russian, DTsPS] in the key branches of material production for the period until 1990. Five interrelated programs are supposed to promote the satsifying of the CEMA countries for energy, fuel, and raw materials; for modern types of machinery and equipment; for the resolution of the foodstuffs problem; for satisfying the efficient needs for manufactured consumer goods; and for the development of transportation ties.

These programs were developed on the initiative of the Communist and workers parties of the CEMA countries in conformity with their general course aimed at the development and deepening of socialist economic integration. Their implementation will solidify the material base for the further rapprochment of the CEMA countries in the area of economics, policy, defense, ideology, and culture.

The adoption of the LTPC means the further reinforcement of the planned principles in international economic cooperation. The economic cooperation among the CEMA countries is taking on an increasingly comprehensive, multifaceted nature. One of the important features of this cooperation is the direct unification of the efforts and means for the implementation of the large-scale projects, the deepening of the division and cooperation of labor in the area of production, science, and technology. Special attention is devoted to the further increase in the effectiveness of production on the basis of the development of joint scientific-research and construction-planning and design operations, and the introduction of the achievements of technical progress into the most important branches of the national economy.

The LTPC are supposed to promote the further bringing together and equalization of the levels of the economic development of the fraternal countries, the broad participation of the industrially less developed ones in the measures involved in the specialization and cooperation of production, the assimilation of the advanced achievements of science and technology, and the increase, on that basis, of the exportation of finished output.

Each of the five LTPC includes the basic fundamental principles that define the strategy of the cooperation among the CEMA countries to satisfy the economically substantiated needs for the appropriate types of output, as well as the subprograms that were developed on their basis and that contain the specific measures, broken down by branches and subbranches.

For the basic measures included in the LTPC, the most important technical-economic indices that characterize their scope are cited. A determination is given for the countries that are participating in their development, the CEMA agencies within the framework of which the cooperation among the countries on the particular measure is being carried out, as well as the deadlines for the preparation of the general or other multilateral agreements.

One of the most typical features of the long-range programs consists in their close correlation with the interests of raising the standard of living of the peoples in the CEMA countries. All the programs are intercoordinated and are subordinated to the single, main goal -- the development of economic and scientific-technical cooperation for the good of the peoples of the socialist countries.

All the long-range target programs are of a comprehensive nature: for each problem, there is a resolution of all the questions that are linked with the carrying out of scientific-research and experimental-design operations, with working out the problems of adjusting to new production or of expanding the existing production, and a determination is made of the ways to support the production with the necessary equipment of a high technical level.

The LTPC have been planned until 1990. During that period of time one can resolve many of the cardinal problems for which the five-year period is too short. The adoption of long-range target programs precedes in time the development of the national five-year plans, and this provides the opportunity to coordinate those plans with the LRPC and to allocate the resources that are necessary for the implementation of the LTPC. Planned for more than a ten-year period of time, the LTPC, as it were, act as a bridge between adjacent five-year plans.

The LTPC are an important link in the functioning system of joint planning activities in the socialist states, and make that system more integral, with precise interaction among its component elements.

When developing an LTPC in the field of energy, fuel, and raw materials, the CEMA countries proceeded from the fact that an important positive factor in developing the national economy of the CEMA community is the high degree of provision with fuel and raw-material resources by means of their production in each country and reciprocal shipments. Reciprocal shipments cover the import needs of the CEMA countries for stone coal and natural gas almost completely; for petroleum and petroleum products, by 80 percent; and iron ore, by 75-80 percent.

The fuel and raw-material branches of the European CEMA countries for the most part are based on modern technology and technological processes. In 1978 the CEMA countries produced 1,613 billion kilowatt-hours of electric energy, which exceeds by a factor of almost 12 the 1950 level; produced 589 million tons of crude oil, or 13 times more, for the corresponding period; natural gas, 408 billion cubic meters, or 44 times more than in 1950. The production of pig iron in 1978 reached 146 million tons, and steel production, 211 million tons.

At the present time the CEMA countries occupy advanced positions in the world with regard to the development of the extractive branches of industry. In the worldwide total of production of stone coal and anthracite the share of the CEMA countries is more than 29 percent; petroleum, approximately 20; gas, more than 29; production of electric energy, more than 21; and steel production, more than 30 percent. As a whole, the share of the CEMA countries is approximately one-fourth of the world's consumption of fuel and energy. The European CEMA countries expend an average of more than 5 tons of fuel per-capita (in terms of standard fuel). That figure attests to the high level of their economic development. For purposes of comparison we might note that the world consumption of energy resources per capita of population in 1975 constituted two tons, and in the Common Market countries, 4.9 tons. The average per-capita consumption of electric energy reached a high level in the CEMA countries. In Bulgaria this index in 1978 was equal to 3,500 kilowatt-hours; in Poland, 3,300; in the USSR, 4,600; in Czechoslovakia, 4,600; in East Germany, 5,700 kilowatt-hours. In such developed industrial countries as, for example, Italy, the consumption of energy resources constitutes 3000 kilowatt-hours, and in France, 3,900.

The Soviet Union has been and continues to be the basic supplier of fuel and electric energy to the CEMA countries. In the current five-year plan (1976-1980), the CEMA countries will receive from the Soviet Union more than 370 million tons of petroleum, 88 billion cubic meters of natural gas, and 64 billion kilowatt-hours of electric energy.

It should be particularly emphasized that Soviet shipments of fuel and energy resources to the fraternal CEMA countries are being carried out under considerably more profitable terms than those existing on the world market. In 1977, Soviet petroleum was exported to the CEMA countries at prices 25-30 perrcent lower than world-market prices. This is especially important under conditions of the high level of world prices of fuel and raw materials. In late 1977 the prices of mineral raw materials were higher than the 1970 level by a factor of 5.7, and the prices of petroleum, by a factor of 7.5. The overall benefit derived by the CEMA countries simply as a result of purchasing the petroleum and petroleum products at lower prices in the Soviet Union, rather than on the world market, will constitute in 1976-1980 more than 5 billion rubles. Thanks to the advantages that have been noted, the fuel and energy crisis that has developed throughout the world, while having exerted its influence also upon the economy of the CEMA countries, has not led to any serious consequences. As a whole the economy of the socialist countries is continuing to develop at stable and high rates, and the planned social programs are being implemented successfully.

However, the only way that the fuel and raw-materials problem can be reliably resolved over the long run is by the collective efforts of all the countries in the community, on the basis of the unification of their financial, materials, and, in individual instances, also their labor resources.

The most important trends in the resolution of the fuel and energy problem in the LTPC are the increase in the production of solid types of fuel; the deepening of the processing of petroleum; the development of nuclear power engineering; the location of energy-intensive branches in areas where the fuel is produced; and the measures for the efficient expenditure and economizing of fuel resources.

In the future decade (1981-1990), even according to the most optimistic estimates, one cannot hope for the same increase -- or an increase close to it -- in the production of petroleum in the USSR which is expected in the current five-year period (1971-1980) -- 280 million tons. In the next decade the Soviet Union will have to carry out tremendous capital investments in the petroleum industry simply to maintain the achieved level of petroleum extraction. In addition, the European part of the USSR, like the European CEMA countries, is experiencing an acute shortage of fuel, especially petroleum and gas, as well as a number of other types of raw and other materials. The basic centers of their extraction and production in the Soviet Union are being transferred, to a greater and greater degree, to the eastern regions.

This is one of the factors influencing the necessity for the CEMA countries to devote considerably more attention to the development of their own extraction of solid types of fuel, to the more complete use of the existing hydroelectric resources. Almost all the CEMA countries have their own considerable resources of stone coal, brown coal, lignites, and shale. Poland, for example, has major resources of stone coal and brown coal at its disposal. Scientific-technical progress in the extraction and enrichment of solid types of fuel, new methods of their power and technological use, make it profitable to involve in national-economic circulation those deposits whose exploitation had previously been considered ineffective.

In order to satisfy the growing needs for liquid fuel, it is planned to increase considerably the depth of petroleum refining. Tentative computations indicate that the yield of light petroleum products must be increased by 1990, on the average, to 60-65 percent, as compared with the current 45-50 percent. It is proposed that the mutually advantageous cooperation between the CEMA countries and the developing states be developed still farther, particularly with the purpose of increasing the purchases of petroleum from them in exchange for the output that they need, which is produced in the CEMA countries.

An important place in the energy balance sheet of the CEMA countries will be occupied by nuclear power engineering. In the European CEMA countries and Cuba, a number of nuclear electric-power stations with all total installed capacity of 37 million kilowatts will be constructed with the technical aid of the Soviet Union. It is planned to build two large-scale nuclear electric-power stations by the joint efforts of the interested countries on the territory of the USSR, with half of the electric energy produced there to be transmitted to those countries in conformity with their share of participation in the construction. The implementation of the plans for cooperation in the development of nuclear power engineering will enable the CEMA countries to produce and to import electric energy in quantity equivalent to 70 million tons of standard fuel, in annual terms.

For purposes of the further unification of the energy systems, the LTPC provide for the construction of intersystem electrical-transmission lines with tension of 750 kilovolts. This year, the first such line, from Vinnitsa (USSR) to Albertirsa (Hungary) was activated.

A factor of unique importance for increasing the fuel-energy and raw-materials potential of the CEMA countries is the joint construction of a complex for the extraction and processing of natural gas on the basis of the Orenburg deposit, and the activation of the 2750-kilometer-long Soyuz main gas pipeline. By means of that pipeline the CEMA countries will receive more than 15 billion cubic meters of gas a year. The high effectiveness of this construction is indicated by computations made by East German specialists: the amount of natural gas that East Germany will receive each year over the pipeline is equivalent to approximately 20 million tons of brown coal. Its extraction and processing in East Germany would require 2.5 times more funds than the shared participation of East Germany in the construction of the Soyuz gas pipeline.

The measures of the LTPC in the area of ferrous metallurgy provide for the complete satisfying of the needs of the CEMA countries for raw materials which contain iron. For these purposes it is planned to construct by the joint efforts of the interested countries two mining and concentration combines and a mine with a total capacity, with regard to the production of pellets and iron-ore concentrate, of 17 million tons, in terms of pure iron.

The implementation of the measures planned for the development of the nickel industry in Cuba will make it possible to satisfy the CEMA countries' nickel needs.

The broad gamut of measures in cooperation pertains to the chemical industry. It is planned to develop production in the USSR, for shipping to the other CEMA countries, of energy-intensive chemical products -- ammonia, methyl alcohol, polyethylene, polyvinyl chloride resin, isoprene and polydivinyl rubber -- in exchange for chemical products which are less power- and material-intensive.

The increase in the consumption of the fuel and raw-materials resources is currently posing in a much more acute manner than ever before the problem of the most effective use of all types of energy carriers and raw materials, all the resources that the CEMA countries have at their disposal. And in the achievement of this goal, the cooperation among the socialist state can yield much more than the isolated efforts of each individual country. In the area of the efficient expenditure and economizing of fuel and raw-material resources, an important role is played by the exchange of experience and by the introduction of the achievements of one country in the everyday practice of the other countries.

The task of the LTPC in the area of agriculture and the food industry consists in the satisfying of the efficient needs for foodstuffs by the population of all the CEMA countries. Consideration is taken of the fact that most of the fraternal countries, on the basis of the socialist reforms in the agarian sector of the economy, have achieved tremendous success in increasing the production of the most important types of output of agriculture and the food industry. As a result, during recent years in the European CEMA countries the problem of nutrition, insofar as the number of consumed calories is concerned, has been resolved. Much was also done to improve the quality of the food commodities and to increase their variety.

The chief trend today is the improvement of the food ration of the population of the countries in the community as a result of the further increase in the share of the output of animal husbandry, as well as vegetables and fruits, and the corresponding reduction in the share of bread and potatoes.

In all the CEMA countries the basic condition for the further upsurge in animal husbandry is the reinforcement of the fodder base, which requires first of all the development of grain management. For purposes of the complete satisfying of all the needs of the CEMA countries for grain, including the creation of the necessary reserves, it will be necessary to increase its production, in per-capita terms, to approximately 1000 kilograms. The average annual grain production in the CEMA countries constituted, during the 1971-1975 five-year period, approximately 256 million tons, or, in per-capita terms, 700 kilograms. Today the problem of providing the European CEMA countries with grain for food purposes has been completely resolved. The task consists in the substantial expansion of the harvesting of fodder grain.

The cooperation among the CEMA countries in the area of agriculture and the food industry already constitutes a well-developed and effective system that encompasses the development of production, scientific-technical cooperation, exchange of experience, etc. This has prepared a good groundwork for the mutual coordination of individual aspects of cooperation in these branches of the economy within a single complex, in the form of the long-range target program.

The intergovernmental specialization of agricultural production of the basic types of output is not yet being advanced as an immediate task for the near future. At the same time, on the basis of the more effective use of the favorable soil and climatic conditions in a number of the CEMA countries, it is planned to expand the specialization and to increase the reciprocal shipments of many specific types of output of agriculture and the food industry.

The most important trends in the LTPC in the area of agriculture include the complete support of the development of the material-technical base in that branch. Today the task in the area of vegetable husbandry consists chiefly not in the replacement of manual labor by machinery, but, rather, in the replacement of one generation of machinery by another generation which is more productive. It has been planned, in particular, on the basis of specialization and cooperation among the CEMA countries, to create and to assimilate the production of a family of tractors with capacity of 150 horsepower and a series of the corresponding agricultural tools, thus making it possible to achieve a substantial rise in the labor productivity.

It is also planned to renew the pool of combines. The jointly created new, highly productive machinese will make it possible to increase by a factor of 1.5-2 the labor productivity in harvesting operations, which account for no less than 60 percent of all the labor expenditures. A number of steps are planned in the area of the mechanization of animal-husbandry processes.

The implementation of the LTPC will make it possible, to a considerable extent, to eliminate the shortage of protein fodders, thus substantially reducing the overall expenditure of fodders per unit of animal-husbandry output. For these purposes, the interested CEMA countries will construct in the Soviet Union a fodder-yeast plant with a capacity of 300,000 tons a year, and will organize cooperation in expanding the production of protein from green plants, as well as the catching, processing, and use of krill (tiny marine Crustacea). In addition, it is planned to extend the development of cooperation for purposes of providing animal husbandry with such output of the chemical and microbiological industry as urea, amino acids, fodder antibiotics, and vitamins A and E. For these purposes it is planned to have the interested countries construct new enterprises in Poland and the Soviet Union.

In conformity with the LTPC in the field of agriculture, cooperation in the field of genetics and selection will receive further development, thus making it possible to carry out more quickly the efficient improvement of agricultural crops and the breeds of domesticated animals, and to introduce the achievements of biological science into production. Special attention is directed at the adaptation of new varieties of agricultural crops and new breeds of animals to the mechanization of processes, both in vegetable husbandry and in animal husbandry.

The LTPC provides for a number of major measures to assure the reliable satisfying of the needs of the public in the CEMA country for sugar, whether produced from sugar cane or from sugar beets. In the solution of this problem, a special place is given to Cuba's sugar industry.

The LTPC in the field of machine-building has as its goal the equipping and re-equipping of selected key branches of material production in the CEMA countries (including the material-technical base of machine-building itself) with technically advanced machinery and equipment, by means of the introduction of progressive technological processes, the raising of the level of mechanization and automation of production, and the broad application of new computer technology and automated control systems.

The goals set in the LTPC will be achieved by means of forms of cooperation which have been well tested by practical life. The forms which are of the greatest importance are the international specialization and cooperation of production; the coordination of plans; the carrying out of joint scientific-research and experimental-design operations involved in the creation and introduction of new types of technology. Broader use will be made of the unification of efforts and material resources in the countries for the creation of new capacities and the remodeling and modernization of the existing production capacities. The work involved in standardizing and unifying the assemblies, units, and parts which make it possible to organize mass and large-series specialized production, must also be carried out extensively on a higher level.

One of the primary trends of the LTPC with regard to machine-building is the providing of machinery and equipment to the fuel-energy and raw-material branches. Major tasks have been posed for the creation and assimilation of new types of equipment for nuclear power stations on the basis of the advanced technology. The leading role in this matter belongs to the Soviet Union. The leader in nuclear machine-building is the specialized Atommash Plant which is being built in Volgodonsk. Late last year its first phase, with a capacity of 3 million kilowatts of reactor equipment a year, was activated. Next year the plant's entire complex will be activated. A considerable number of reactors for nuclear power stations being built in the fraternal countries will be produced by Czechoslovakia.

The necessity of the further increase in the production of solid types of fuel predetermined the development of special measures to satisfy the needs of the CEMA countries for the corresponding machinery and equipment. Provision has been made for the creation, by joint efforts, of capacities for the production of mechanized mine props, clearing and shaft-drilling combines, concentration equipment, etc. One example of the new technology is provided by the world's most powerful rotary excavator which was recently installed in Ekibastuz, and which produces 5000 tons of coal an hour (the ERShD-500).

Still another very important task that has been posed in the LTPC in the field of machine-building is the creation and organization of the production of large-scale, technically complex units for the profound refining of petroleum, as well as equipment for the drilling of deep wells and for ocean drilling.

Today the problem of protecting the environment has taken on a worldwide, global nature. For its successful resolution the efforts of any country taken separately are insufficient. Instead, broad international cooperation is needed. The CEMA countries have come forth as the initiators of this kind of cooperation. The LTPC in the field of machine-building provides for a broad series of measures involving the specialization and cooperation in the production of gas-purification and dust-catching equipment, including electrical filters, sleeve filters, inertia units, units to trap chemical components and render them harmless, and industrial vacuum cleaners.

Provision has been made for the deepening of specialization and cooperation in the production of technological equipment and complete mechanized flow lines for canning enterprises, as well as production lines for bottling potable liquids, production lines for packing and packaging of food products.

Plans have been made for the deepening and expansion of specialization and cooperation in the production of technological equipment for modern highly productive sugar refineries of various capacities, as well as equipment for the meat, dairy, and oil-and-fats industry.

For purposes of developing machine-building itself and its efficient reorganization, the basic efforts in the cooperation will be directed at guaranteeing the production of heavy and one-of-a-kind metal-cutting machine tools, highly productive metal-cutting machine tools with digital programmed control, and multi-operational machine tools with magazines for the automatic replacement of the cutting tool, as well as automatic lines, forge-press equipment, and industrial manipulators

The LTPC in the field of consumer goods is supposed to promote the resolution of the problem of satisfying the substantiated needs of the public for various commodities of high quality. Practically all the branches of national economy participate in the resolution of this task. However, special responsibility is borne by the textile, footwear, garment, and other branches of light industry, as well as the woodworking and appropriate subbranches of the radio electronic and machine-building industry. It is precisely these branches which are encompassed by measures of the LTPC in the field of consumer goods.

The cooperation among the CEMA countries long ago became an important factor in raising the national standard of living. For the Soviet Union, the importing of mass consumer goods from the fraternal countries is an essential addition to the Soviet Union's own production. For such commodities as furniture, footwear, and ready-to-wear clothing, the shipments from the CEMA countries cover no less than 15 percent of the assets in retail trade. Shipments from the CEMA countries substantially expand the variety of the commodities on the USSR domestic market. By constituting the healthy competition for Soviet-produced commodities, the importing of similar products exerts a favorable influence upon improving the quality of those commodities.

The desirability and profitability of exporting mass consumer goods for the CEMA partners of the Soviet Union consist in the fact that the proceeds obtained in exchange for these commodities makes it possible for them to import fuel, raw and other materials, machinery, and equipment that are needed for the normal course of the reproductive process.

An important place in the LTPC is occupied by the measures that are aimed at the complete expansion of the reciprocal trade in finished articles -- fabrics, knitwear and hosiery, leather footwear, garments, carpets, toys, chinaware, and articles made of crystal and glass.

The development of production for purposes of increasing the exchange will occur in every country, as a rule by that country's own efforts and with its own funds. For example, Bulgaria, Romania, and Czechoslovakia will create capacities for the production of upholstery fabrics for shipment to Mongolia, the Soviet Union, and East Germany. The same method will be used to expand the production and shipment of furniture. At the same time, certain enterprises will be carried out by uniting the efforts and the material and financial resources. It is planned to build in Bulgaria and the USSR, with the participation of interested countries, factories for the production of carpets. It is also planned to develop the specialization and cooperation in those types of production entities that produce consumer goods, wherever such specialization and cooperation are effective. Agreements dealing with the specialization of the production of nonwoven materials, as well as special types of furniture, will also be prepared.

The LTPC encompasses a broad gamut of measures for improving the job of supplying the textile, footwear, and furniture industry with the necessary raw materials and with semiprocessed and other materials. Special attention is being devoted to cooperation in the creation of new production capacities for scarce types of chemical fibers, and for specialization in their production. It is also planned to develop cooperation in the creation of new types of high-grade synthetic hides, which can be completely acceptable substitutes for natural hides.

The increase in the production of consumer goods, and the improvement of their outward appearance and attractiveness, depend to no small degree upon the extent to which their production is provided with high-grade synthetic dyes, subsidiary textile substances, lacquers, fittings, etc. The LTPC provides for the active development of cooperation in these areas.

An important problem in the implementation of the LTPC in the area of consumer goods is the providing of the textile, garment, footwear and furniture industry with the necessary equipment both for new enterprises and for the modernization of the existing ones. In the textile industry of the CEMA countries, for example, approximately half the spindles and looms that have been installed at the existing enterprises are obsolete and need to be replaced by new technology or need to be modernized. Plans have been made for the further introduction of the nonspindle method of spinning, the use of which increases labor productivity by a factor of 2-2.5. The application of shuttleless looms increases labor productivity in the cotton-fabrics branch by a factor of 1.5-2, and in the wool and silk branches, by a factor of 2.5-3.

The domestic market of the CEMA countries is being saturated to a greater and greater extent with durable goods. In the European CEMA countries a refrigerator and washing machine, a vacuum cleaner and transister receiver, a television set and electric razor have become completely ordinary in every family, both in the city and in the countryside. There has been a constant renewing and expanding of the variety of goods. For purposes of the more complete satisfaction of the substantiated needs of the workers for durable goods, within the framework of the LTPC for consumer goods, measures have been developed for cooperation in the solution of problems pertaining to color television, as well as visual-recording and reproducing apparatus, individual types of sound-recording and sound-reproducing apparatus, and modern designs of refrigerators, freezers, and washing machines.

The interested countries will develop and create new promising models of these types of products at a high technical level and with consumer properties based on the joint conducting of scientific-research and experimental-design work. It is planned to develop the cooperation of production and reciprocal shipments of components and parts for color television sets, including color picture tubes, as well as for washing machines and refrigerators.

The LTPC in the field of transportation takes into consideration the fact that today transportation is one of the decisive sectors in the struggle for effectiveness and quality in the national economy. Without smoothly operating transportation ties, it would be impossible to carry the complete rapprochement of the socialist states, or the development of economic integration. In addition to the serving of foreign trade, transportation plays an important role in the development of international tourist and cultural exchange.

At all stages in the reciprocal cooperation among the CEMA countries, transportation, for the most part, has coped both with the shipments of domestic and foreign-trade freight, and with passenger hauls. During 1951-1977 the freight turnover of all types of transportation in the CEMA countries increased by a factor of 8 and in 1977 came to more than 6300 billion ton-kilometers. The passenger turnover in the same year reached 1110 billion passenger-kilometers, which surpasses by 4 times the 1955 level. The cooperation among the CEMA countries in the field of transportation both on a bilateral and a multilateral basis, currently encompasses practically all areas of transportation activity. This cooperation, in particular, is carried out in the area of the modernization of the most important mainlines used in international traffic. Reciprocal shipments of rolling stock have made it possible, on the railroads that link the CEMA countries, to replace steam locomotives with electric and diesel locomotives, and to introduce modern railroad cars. Automated blocking systems are being introduced on a broader and broader scale. This has substantially increase the handling capacity of the railroads and has increased traffic safety. Border points on railroads and border stations have been expanded.

Steps are being taken jointly to standardize the rolling stock and repair machinery. In 1964 the Common Railroad-Car Pool (OPV) was created. That jointly operated pool currently has 300,000 units, and that fact has made it possible to reduce the number of idle runs by the railroad cars. A uniform container-transportation system for the CEMA countries has been created and is developing, and a bureau for coordinating the chartering of ships is in operation. Pipeline transportation has received broad development in the CEMA countries. The operation of the Druzhba petroleum pipeline makes possible an annual saving of 250-300 million rubles in the transportation of petroleum.

At the same time, in transportation, including reciprocal communications, a number of complicated problems constantly arise. The necessity of finding the most effective ways to resolve these problems has been one of the reasons for the development of the LTPC in the field of transportation. That program determines the long-range strategy in the development of the transportation ties of the CEMA countries. Its basic purpose is the quantitative and qualitative satisfying of the economically substantiated needs for reciprocal shipments of freight and passenger, by means of the further coordinated development of the national transportation systems of the CEMA countries, and their closer and closer interaction, which is based on modern technical means and advanced technology.

For the LTPC in the field of transportation, it is typical that the construction of roads and of road structures is carried out by each country on its own territory by the use of its own efforts and means. At the same time, there is coordination concerning matters of the class structure of the roads, their handling capacity, and the deadlines for construction and other parameters are synchronized. The participating countries pledge to provide, in their five-year and annual plans for the development of the national economy, the appropriation of the necessary financial and labor resources for these purposes. However, wherever this is feasible, use is also made of other forms of cooperation, including the unification of efforts and means.

In the area of railroad transportation, plans have been made for the remodeling and technical re-equipping of 14 international railroad lines in the East-to-West sector (linking the Soviet Union with the European CEMA countries), which will carry such bulk freight items as iron ore, stone coal, and ferrous and nonferrous metals. Four lines will also be remodeled in the North-to-South sector, which provide links between the East German and Polish Baltic ports and the Black Sea ports of Bulgaria and Romania. On a number of sectors on these roads, work has already been started. For example, in the USSR the construction of a new railroad line from Dolinskaya to Pomoshchnaya, with a total length of approximately 150 kilometers, has been carried out. That made it possible to achieve a considerable improvement in the transportation and economic ties between the Krivoy Rog area and the Dnepr area, on the one hand, and the western oblasts of the Ukraine, on the other, and by way of them, the CEMA countries, and provided the shortest exit for Krivoy Rog ore to be exported by way of the Reni, Mostysku, Batevo, and Uzhgorod border points.

Something that became a bottleneck for moving export and import freight shipments among the CEMA countries was the shortage of processing capabilities at individual border stations. The LTPC provides for the creation of new border crossings between Hungary and the Soviet Union, between the Soviet Union and Czechoslovakia, and between East Germany and Czechoslovakia.

An important measure that frees the capacities of the reloading and the freight-transferring bases is the widespread construction of railroad lines with the wide gauge that is standard in the USSR. Such a line has already been constructed in Czechoslovakia as far as the city of Kosice and is being constructed in Poland as far as the metallurgical combine in Katowice. Apparently one can already speak today about the fact that this has indicated a very effective path for the development of the transportation ties between the USSR and the other European CEMA countries, a path which will make it possible to delivery fuel, raw materials, and other commodities directly to the consumers, obviating the reloadings at the border.

One of the most important measures in the area of water transportation is the creation of a sea-ferry crossing between the Bulgarian port of Varna and the Soviet port of Il'ichevsk. It is expected that in 1979 the volume of shipments here will reach 3 million tons. Measures are provided for the development of the ports in the Republic of Cuba, particularly the construction of crude-oil and fuel-oil loading and unloading points for large tankers, as well as a container terminal in the port of Havana. It is planned that the trade fleets of the CEMA countries will be provided with new ships with the complete mechanization of the loading and unloading operations and the automation of the production operations.

In the area of motor transportation, there will be cooperation in the expansion and construction of four international highways with a total' length of 8,800 kilometers. It is planned to equip them for the serving of passengers and transportation means. The corresponding attention is being directed at the creation of new progressive types of trucks with high technical-economic parameters, with increased hauling capacity, and the minimum pollution of the environment.

In the area of air transportation, there will be cooperation in the development of international airports, and in providing for the repair of air technology on the basis of multilateral international specialization. For these purposes the interested countries have agreed to carry out the joint construction, on the territory of the USSR, of a plan for the repairing of civil aircraft engaged in long-range and medium-range flights.

Within the forthcoming years the development of the material-technical base, and the re-equipping of the civil aviation in the CEMA countries with new aircraft, will continue. Wide use is already being made of the comfortable high-speed IL-62, TU-134, and TU-154 jet airplanes. The local lines are beginning to make wider use of the L-410 micro-airbus with two turboprop engines. It was created by Czechoslovakian designers with the active participation of Soviet air specialists. In 1979 the operation of the 350-seat IL-86 airbus air-liner will begin. State tests have also been carried out and the operation of the IL-76T "trucks" and the MI-10K crane-helicopter has begun. By means of the introduction of new types of multiseat and large-cargo aircraft there will be a significant increase in the labor productivity in civil aviation and the load carried by air space will be eased.

The adoption of the LTPC which render in a concrete manner and develop the Comprehensive Program for Socialist Economic Integration, has determined the chief content of the activities of the CEMA and all its agencies at the modern stage. The work of the CEMA and the other international organizations of the CEMA countries is concentrated to a greater degree on the carrying out of planned cooperation on a long-term basis, on the rendering of assistance in the immediate unification of the efforts and means of the CEMA countries for implementing the large-scale projects included in the LTPC, and on the deepening of the division and cooperation of labor in the area of production, science, and technology. The immediate task for the next segment of time consists in assuring, on the basis of the LTPC, the preparation and conclusion of long-range multilateral and bilateral agreements, and then guaranteeing the complete implementation of the obligations evolving from them.

By adopting the LTPC. the CEMA countries reaffirmed their readiness to participate actively in the international division of labor in conformity with the unchangable course of their peace-loving foreign policy in the spirit of the principles and obligations contained in the Concluding Act of the Conference on Security and Collaboration in Europe, which was held in Helsinki, and to promote the establishment of mutually advantageous international economic relations. The CEMA countries will continue to develop relations of cooperation with third countries belonging to various social systems, in the interests of deepening the international division of labor on a just, equal, and mutually advantageous basis.

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# INTERNATIONAL ECONOMIC RELATIONS

## ECONOMIC EFFECTIVENESS OF SCIENTIFIC-TECHNICAL COOPERATION IN CEMA

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[Article by S. I. Stepanenko]

[Text] The article considers the questions of defining the economic effectiveness of the scientific-technical cooperation among the CEMA countries. It provides a methodological approach and formulas which can be used when determining the economic effectiveness of cooperation in the area of science and technology among the CEMA countries.

Given the nature of modern NTR [scientific-technical work], the questions of increasing labor productivity and the effectiveness of production in the national economy of the CEMA countries are taking on particular importance. "In order to resolve successfully the varied economic and social tasks confronting the country," L. I. Brezhnev emphasized at the 25th CPSU Congress, "there is no other path than the rapid increase in labor productivity, the sharp increase in the effectiveness of social production as a whole. The emphasis upon effectiveness. . . is a very important component of our entire economic strategy"[1].

The strategy aimed at increasing the productivity of social labor with the use of the advantages of the international socialist division of labor is being consistently implemented in all the countries of the fraternal community. It found its expression in the Comprehensive Program for Socialist Economic Integration and Long-Term Specially-Earmarked Programs for Cooperation, which are directed at satisfying the needs of the CEMA countries for energy, fuel, the basic types of raw materials, products of agriculture and the food industry, manufactured consumer goods, the development of transportation ties, and at the development of machine-building.

The reduction of the expenditures of time and funds at all stages of the creation and introduction of new technology (science--technology--production--

sale--consumption) has been recognized by the CEMA countries as the basic criterion of the economic effectiveness of the international socialist division of labor.

The main line in the economic development of the socialist countries is the use of the resources available to every country and the advantages of the international socialist division of labor in the sphere of science, technology, and production, which assure the high effectiveness of social production. Therefore the problem of improving scientific-technical cooperation (NTS), of increasing its effectiveness, has become an objective necessity of today.

While promoting the accelerated development of industry, agriculture, construction, transportation, and other branches of the national economy in the countries of the socialist community, NTS at the same time yields a high economic benefit both at the preproduction stage (in the sphere of scientific research and technical developments) and at the stage of production and consumption.

Usually when one speaks of the economic effectiveness of scientific-technical cooperation, one, as a rule, deals with general evaluations. And yet it is important to know exactly where, when, and why it is necessary to carry out a particular cooperative measure. The cooperating organizations should know the expenditures and the benefits from scientific-technical cooperation. The economic effectiveness of the NTS is necessary for the purpose of ascertaining the specific tasks of scientific-technical development, the resolution of which on the basis of mutual cooperation is economically more beneficial; for choosing the most effective form of implementing the cooperation and organizing the research and technical developments within the framework of the NTS; for determining the conditions for cooperation with foreign partners, which assure its effectiveness and mutual advantageousness; and, finally, for establishing that benefit that will accrue to the national economy of the CEMA countries as a consequence of the implementation of various measures in scientific-technical cooperation.

In order for the cooperating countries to be able to determine the particular effectiveness, it is necessary to have a methodology for determining it, which methodology takes into consideration the national experience of the countries that they have accumulated in these questions and which is based upon uniform methodological principles.

The economic effectiveness of cooperation in the area of science and technology manifests itself for the countries participating in it in the form of a saving of the socially necessary labor, which saving is obtained as a result of the reduction of the expenditures for scientific-research activities and for the introduction of the obtained, finished scientific-technical results [2] into the national economy of the CEMA countries.

It is also necessary to take into consideration the fact that the results obtained by the countries were already developed (finished) by some other country and are used by it in practice (compensated and uncompensated exchange of technical documentation, licenses, technological processes, models, etc.) or the obtained results were developed by the joint efforts of the countries by virtue of their NTS (by meaning of coordination or cooperation, or by means of the joint carrying out of operations) and must be used in practice. In this regard, when determining the effectiveness of the NTS it is necesary to establish whether the economizing arises as a result of international socialist division of labor which has already occurred in the area of scientific research and technical developments, or which is planned.

The basic criterion of the economic effectiveness of cooperation is the increase in productivity of social labor. This increase can be: a) in the sphere of scientific-research and construction-planning and designing activities (preproduction stage); or b) in the corresponding branches of production where the obtained scientific-technical results are being used (production stage).

Yet, until recently the economic effect of this cooperation has been evaluated only in the sphere of the production stage as the total result of the introduction of the scientific-technical results (the new technology). As for the preproduction stage, where the scientific-research and construction-planning and designing operations were carried out by means of the use of a particular form of NTS, it was, as a rule, not taken into consideration and the effect was not determined.

In our opinion, the economic effectiveness of cooperation in the area of science and technology must be evaluated on a comprehensive basis, in its interrelationship with the effects obtained exclusively from the selection of a particular form of cooperation among the CEMA countries and the acceleration of the introduction of the NTR into production. The results of the NTS are determined by comparing all its positive effects and can be substantiated by means of mathematical computations. When computing the economic benefit as a whole from the cooperation, it is necessary to take into consideration the immediate benefit obtained from the use of the particular form[3] of NTS ($B_{f.c.}$); the benefit obtained from the acceleration of the introduction of the NTR into production as a result of the preterm obtaining of the assigned scientific-technical result ($B_{a.i.}$); and the benefit obtained in the sphere of the production stage as a result of introduction of the NTR (new technology ($B_{i.r.}$). Thus, it is necessary to strive for themost complete expression of the benefits of cooperation, that is, for the expression not only of the benefits arising as a consequence of the NTS in the very sphere of scientific and technical research, but also of the benefits arising in the course of the introduction and use of its results. With this approach, the economic benefit of the NTS ($B_{s.t.c.}$) can be expressed by the following formula:

$$B_{s.t.c.} = B_{f.c.} + B_{a.i.} + B_{i.r.}. \qquad (1)$$

In order to evaluate the immediate benefit obtained from the application of a particular form of the NTS that guarantees the obtaining of an identical scientific-technical result (NTR) within the identical time frame, one can make use of the formula proposed by Soviet economists Yu. A. Kormnov and O. A. Chukanov[4]:

$$B_{f.c.} = E_{n.} - E_{f.c.}, \qquad (2)$$

where $E_{n.}$ are the country's expenditures for the obtaining of the assigned NTR [scientific-technical result] within the established, planned time frame only by national (domestic) efforts (without cooperation with other countries), units of national currency; $E_{f.c.}$ is the country's expenditures for fulfillment of the assigned NTR [scientific-technical result] according to the specific form (version) of the scientific-technical cooperation, units of national currency.

The expenditures $E_{n.}$ are determined on the basis of financial-estimate computations carried out in conformity with the existing national methods and recommendations.

The computations made according to formula (2) make it possible to establish that, if the composite expenditures for the achievement of the assigned goal (to obtain the scientific-technical result with the specific form of cooperation among the interested countries) are less than the expenditures when working with the efforts of the scientists and specialists of only one's own country, then this kind of NTS is effective ($E_{f.s.}$).

But it also happens that a particular CEMA country that has moved ahead in a particular area can resolve more quickly, more inexpensively, and in a technically better manner a particular scientific-technical problem only by its own efforts and means, without resorting to the assistance of the scientists and specialists in the other CEMA countries. Then that country can, either with or without compensation, transfer the scientific-technical result to the other country (countries).

In order to determine the benefit of the NTS in the form of uncompensated receipt of scientific-technical documentation, let us use formula (2). The expenditures according to the specific form of the NTS ($E_{f.c.}$) are formed from the postal expenses to import the documentation, to have it copied and put into brochure form, and also the expenses to adapt the obtained scientific-technical results to the national conditions. The expenditures which would have to be incurred in the country during the execution of the scientific research and technical developments by one's own efforts ($E_{n.}$) for the obtaining of the scientific-technical result equal to that contained in the imported documentation (minus the indicated small expenses) become the net saving as a result of cooperation in the form of the uncompensated obtaining of the scientific-technical documentation. Less frequently, simultaneously with the imported documentation, one also transmits gratis one's own documentation, but for another article that does not pertain to the imported documentation. Transforming formula (2), we obtain:

$$B_{f.c.} = E_{n.i.} - E_{n.e.}, \tag{3}$$

where $E_{n.i.}$ are the country's expenditures for the creation of the necessary scientific-technical result by one's own efforts, units of national current (if there were no import documentation); and $E_{n.e.}$ are the country's expenditures for the exported documentation, units of national currency.

The gain in this instance will be in direct proportion to the amount of labor that was embodied in the imported documentation as compared with the exported labor. Actually, by importing uncompensated technical documentation, a country obtains a real saving ($E_{n.i.}$) in the complete sum of the expenditures of material and financial means and labor that it is not required to carry out (minus the expenditures involved in the obtaining of the scientific-technical results, and the expenditures for the adapting of the obtained results to the national conditions). The computation of this saving (according to national branch methodologies) is not a simple matter, but it is completely feasible.

It is more complicated to establish that part of the overall expenditures which pertains to the exported documentation ($E_{n.e.}$). It is understandable that the exporter country has no justification for including in the settlement all its actual expenditures for the scientific research and development involved in the documentation to be transmitted to another country, since part of them, by the time that the scientific-technical results are being exported, have already been "amortized" in domestic production. Even when transmitting documentation for new output, it is not correct to include in the exported documentation all the expenditures incurred in the obtaining of the scientific-technical results embodied in that documentation. But if one does not include all the expenditures, which part of them should be included?

Under conditions of the uncompensated exchange of documentation among the CEMA countries, the value of $E_{n.e.}$ is equal to zero, since the exporter country has not incurred any actual expenditures for other countries, but has carried out the development by itself and has worked out the production-adjustment problems only for itself. Therefore formula (3) will have the form:

$$B_{f.c.} = E_{n.i.} - (E_{e.i} + E_{ad.}), \tag{4}$$

where $E_{e.i.}$ is the country's expenditures that are linked with the obtaining of the NTR [scientific-technical result] by means of the scientific-technical exchange (postal expenses for importing the documentation, expenses to pay for the copying and brochuring of the documents, etc.), units of national currency; $E_{ad.}$ is the expenditures for adapting the obtained scientific-technical results to the national conditions[5], units of national currency.

Starting in the early 1970's, especially after the adoption of the Comprehensive Program for Socialist Economic Integration, it is become a broader and broader practice in NTS to use the paid exchange of scientific-technical results. This was an important steap in the creation of the best economic conditions for developing the specialization and cooperation of scientific and technical research, and for making the most rapid use of the obtained scientific-technical results.

In order to determine the benefit of the NTS (for example, for the USSR) with the paid obtaining of the NTR [scientific-technical result], let us use the following modification of formula (2):

$$B_{f.c.} = E_{n.} - P_{d.i.} \frac{1}{X_e}, \qquad (5)$$

where $P_{d.i.}$ is the price of the documentation imported from the other country, in convertible rubles; $X_e$ is the mean coefficient[6] of currency effectiveness of export of USSR commodities to the country where the documentation is purchased.

Sometimes, between related scientific-research and construction-planning and designing organizations in the CEMA countries, there is possible a kind of "commodity exchange," that is, the reciprocal transmittal of documentation for which payment is made. In order to evaluate the benefit of this form of NTS, let us use formulas (3) and (5), after making the appropriate modifications in them:

$$B_{f.c.} = E_n - (P_{d.i.} - P_{d.e.}) \cdot \frac{1}{X_e}, \qquad (6)$$

where $P_{d.i.}$ is the price of the imported documentation, in convertible rubles; $P_{d.e.}$ is the price of the exported documentation developed by the domestic organizations, in convertible rubles.

At the present time the commodity exchange of documentation represents an increasingly smaller percentage in the cooperation, and there has been an increase in the carrying out of developments by the joint efforts of the countries engaged in scientific research and development with the use of various forms of NTS that provide various benefits while assuring the identical economic results (quantity, quality of output and time of obtaining it) from the use of one version of NTS as compared with the version for obtaining the same result by one's own efforts. The reduction of the expenditures of time and funds at the preproduction stage, that is, in the area of scientific research and development, is one of the sources of increasing the effectiveness of social production.

If one considers that, according to certain evaluations, the costs of manufacturing articles in the processing industry at the present time are determined in the amount of 75 percent[7] in the sphere of scientific-research and experimental-design developments, then one begins to realize the important role that is played in expenditures by the preproduction stage of the life cycle of the new technology.

It is well known that the overall tendency of modern NTP [scientific-technical progress?] is such that it involves increasingly considerable material expenditures, which frequently are beyond the capabilities of a single country, especially a small one. Therefore it is becoming increasingly necessary to carry out scientific and technical research by the combined efforts of several countries, thus assuring the addition and efficient use of the material and labor resources of the interested countries.

The CEMA member countries, in carrying out scientific and technical research studies, are self-interested in the most effective form of cooperation. The selection of this form is not a simple task, since this choice depends upon many factors. The factor which, in our opinion, is the chief and determining one, is the economic factor. It is precisely that factor that makes it possible to establish the advantages of the selected form.

Thus, in order to establish the optimal form of the NTP, it is necessary to determine its comparative effect. It is important to keep in mind the fact that, irrespective of which organizational form of cooperation was used to develop the scientific-technical research, one can always determine the economic expenditures for developing them.

The specific computation of the effectiveness should indicate the saving of time and funds when carrying out scientific research and development in a particular form of NTP. When computing the economic benefit of the specific form of cooperation (for example, when conducting scientific-technical research by means of coordination), one can make use of formula (2), by substituting new values in it:

$$B_{f.c.} = E_{n.} - E_{n.p.c.} - E_{m.c.}, \qquad (7)$$

where $E_{n.}$ is the national expenditures of the country for the entire volume of the work, in units of national currency; $E_{n.p.c.}$ is the national expenditures of the country for the execution of a share of the operations on the topic in conformity with the pledges that it has assumed (the working plan for the topic), in units of national currency; and $E_{m.c.}$ is the expenditures for the measures to be carried out when conducting the operations in the form of coordination (expenditures for maintenance of an NTS apparatus, the conducting of scientific and coordination conferences, etc.), in units of national currency.

Formula (7) is applicable in those instances when the exchange of the corresponding scientific-technical results among the national scientific-research and construction-planning and design organizations in the CEMA member countries is being carried out on a noncompensated basis. This form of cooperation is known as the coordination of scientific and technical research that is of mutual interest, and is carried out by the national organizations of the CEMA member countries according to a coordinated topics list, as a rule, on the basis of the division of the labor among the participating organizations (cooperation on the basis of working plans). Its advantage consists in that, provided there has been fulfillment, say, of one-seventh of the overall work according to the coordinated topics list and it has been transmitted to the six partners (just as they do, in their turn), one can make use of the complete scientific-technical result. However, this form of cooperation is carried out when compiling the plan for the scientific-technical cooperation among countries by a nontreaty procedure and therefore it is not always done with complete responsibility. The formation of cooperatives on the basis of treaties makes it possible to overcome these shortcomings.

The formation of cooperatives in the carrying out of scientific-technical research is carried out on the basis of agreements or treaties by means of the division of labor with the maximum coordination among the assignments, stages, and deadlines for the carrying out of the work according to the coordinated programs. In the treaties (agreements) dealing with the formation of scientific-technical cooperatives, there is an indication of the project (problem) being collaborated on; a list of the basic tasks for resolving the problem; the share of each partner in the overall volume of the work; the purpose, the expected results, and the form of the completion of the work; the total expenditures for development; and other questions.

The benefit of this type of cooperation can be determined according to the formula:

$$B_{f.c.} = E_{n.} - P_{d.i.} \cdot \frac{1}{X_e} - E_{n.p.p.} - E_{c.c.}, \qquad (8)$$

where $P_{d.i.}$ is the price of the imported documentation, recomputed in the national currency; $E_{n.p.p.}$ is the country's national expenditures for part of the overall work to be fulfilled by the particular country in conformity with the treaty and program as a result of its participation in the cooperative effort, in units of national currency; $E_{c.c.}$ is the country's expenditures for carrying out measures involved in the organization of the work in the cooperative form (conducting of scientific and coordination conferences, the maintenance of working agencies involved in the cooperation -- coordination centers, etc.), in units of national currency.

With this form of cooperation, the country's actual expenditures are made up of the expenditures to purpose the documentation from the other partners in the cooperative effort ($P_{d.i.} \cdot \frac{1}{X_e}$); the real expenses from the country's own part of the work to be executed within the framework of the cooperative effort; and the expenditures for the conducting of measures involved in the cooperative effort. If the actual expenditures are designated by $E_{a.}$, formula (8) will assume the form:

$$E_{f.c.} = E_{n.} - E_{a.}, \tag{9}$$

where $E_{a.} = P_{d.i.} \cdot \frac{1}{X_e} + E_{n.p.p.} + E_{c.c.}$.

At the present-day stage in scientific-technical cooperation, there arises more and more frequently the need to resolve overall tasks by combined efforts, that is, to unite organizationally the scientists and specialists from the interested countries in a single location, in a single research or design center, that is, to consider the creation of various kinds of international scientific-technical organizations (MNTO) -- temporary international scientific-research collectives and joint laboratories (departments), as well as international scientific-research institutes and construction-designing and planning organizations, and international scientific-production organizations operating according to cost-accounting principles. In order to evaluate the economic effectiveness of the version of achieving the assigned result by means of the joint conducting of research with the mediation of the MNTO, one can use modified formula (2), namely:

$$B_{f.c.} = E_n - E_{i.o.}, \tag{10}$$

where $E_{i.o.}$ is the country's expenditures in the fulfillment of the scientific-research and construction-planning and design operations when it is participating in an MNTO, in the form of shared financing, in units of national currency.

In this instance the participating country receives without compensation the results of the scientific research and development for use in the national economy.

If, however, a treaty has stipulated the payment of compensation for the obtaining of an NTR [scientific-technical result], formula (10) will have the following form:

$$B_{f.c.} = E_{n.} - E_{i.o.} - P_{d.i.} \cdot \frac{1}{X_e}, \tag{11}$$

where $P_{d.i.} \cdot \frac{1}{X_e}$ is the country's expenditures for the purchase of the the documentation from the MNTO, in convertible rubles (coefficient $X_e$ in this instance is employed in the amount of the mean value for the country's export as a whole).

In addition to the considered forms of carrying out scientific and technical research by means of coordination, cooperative effort, and the joint conducting of research, one also uses, not infrequently, such a form of cooperation as the carrying out of scientific-research work on the basis of work orders.

The economic benefit derived by the customer country from the formalization and obtaining of the results of work done according to work orders is defined as the difference between the expenditures to obtain the necessary scientific-technical result by one's own efforts, and the expenditures to obtain the identical result by means of work done on the basis of work orders:

$$B_{f.c.} = E_{n.} - (E_{c.o.} + E_{or.}), \qquad (12)$$

where $E_{c.o.}$ is the country's expenditures to obtain the NTR on the basis of a work order, in units of national currency; $E_{or}$ is the expenditures to organize the obtaining of the NTR, in units of national currency.

The economic benefit derived by the executor country as a result of the fulfillment of the work according to work order and the transmittal of its results is defined as the difference between the currency proceeds in exchange for the executed work that was ordered, and the expenditures for its execution:

$$B_{f.c.} = A_{e.p.} - E_{o.w.}, \qquad (13)$$

where $A_{e.p.}$ is the amount of proceeds in exchange for the executed work and the transmittal of its results, recomputed in units of national currency; and $E_{o.w.}$ is the expenditures of the executor country for the execution of the order work, in units of national currency.

In the practical situation one can observe when, in order to achieve the planned scientific-technical result, it is necessary to use several forms of scientific-technical cooperation. This is encountered most frequently when carrying out such a form of scientific-technical ties as direct cooperation among the appropriate agencies and organizations in the CEMA member countries. In this instance the combined economic benefit will be:

$$B_{v.f.} = E_{n.} - \sum_{i=1}^{n} E_{f.c.}, \tag{14}$$

where $B_{v.f.}$ is the benefit from the various forms of NTS which are being employed simultaneously; $E_{f.c.}$ is the expenditures for the specific form of NTS, in units of national currency; 1,2,3,...*n* are the forms (versions) of the NTS.

Having computed the economic benefit of a particular form of cooperation, by means of comparison one can select the most efficient form for the conducting of the scientific and technical research by the joint efforts of the CEMA member countries. For this purpose, the following formula is applicable:

$$B_{b.f.} = E_{f.c._1} - E_{f.c._2}, \tag{15}$$

where $B_{b.f.}$ is the benefit from the best form of the NTS.

In a number of instances the expenditures for the national research and design developments without cooperation with other countries can be less than with this kind of cooperation; however, they continue for several years more. As a result there is the possibility of technical lagging or the undesirability of introducing the obtained result into production, or the acceleration of its obsolescence. The saving in expenditures can prove to negate all the borne material and monetary expenditures because of the "overexpenditure" of the unstorable resource that time is.

Accelerating the scientific-research and construction-planning and design developments, and their introduction into production, means obtaining an additional benefit and prolonging the life cycle of the machine, instrument, or equipment.

In order to reduce the losses in the national economy as a result of the obsolescence of the technology, it is necessary to accelerate the "research-production" cycle, since "the shorter the period during which its (a machine's) cost is reproduced, the less danger there is of obsolescence"[8].

The duration of the effective use of the new technology, and, consequently, teh total economic benefit, will depend to a considerable degree upon the speed with which the achievements of science and technology are introduced into production.

In our opinion, an evaluation of the benefit derived from the acceleration of the introduction of an NTR [scientific-technical result] into the national economy as a result of obtaining it ahead of schedule can be made according to the formula:

$$B_{a.i.} = (B_{n.t.} - B_{o.t.}) \cdot Q_p \cdot T\,(1 + 0.08)^{t-1}, \qquad (16)$$

where $B_{n.t.}$, $B_{o.t.}$ are the computed benefit from the use of each unit, respectively, of old and new technology (in the USSR, this benefit is determined according to the Methodology for Determining the Economic Effectiveness of the Use of New Technology in the National Economy, which was approved on 14 February 1977); $Q_p$ is the number of units of new technology, acquired preterm; T is the number of years by which the national economy receives the new technology ahead of schedule; $(1 + 0.08)^{t-1}$ is the formula for converting the annual benefits from the preterm introduction of the new technology to the year that had been previously planned for its introduction.

The third component of form (1) is the benefit ($B_{i.r.}$) obtained in the sphere of the production stage, as the consequence of the introduction of the scientific-technical results into the country's national economy. In order to determine it, one can make use of the existing national methodologies and instruction guides for determining the economic effectiveness. For example, in the Soviet Union the methodology which is used is the one that was previously mentioned by us -- the Methodology (Basic Principles) for Determining the Economic Effectiveness of the Use of New Technology, Inventions, and Efficiency-Improvement Suggestions in the National Economy (1977)[9]; in Bulgaria -- Order No. 5, dated 1 October 1977, concerning the determination of the economic effectiveness of scientific-technical achievements and capital investments; in Poland -- the Methodology for Evaluating the Economic Effectiveness of Research Projects (1976); in Czechoslovakia -- Instruction Guide No. 4 of the Federal Ministry for the Development of Technology and Capital Construction, dated 19 May 1972, for computing the economic effectiveness of the assignments in the State Plan for the Development of Science and Technology.

If it is necessary to determine the economic benefit from the scientific-technical cooperation among the CEMA member countries with regard to individual topics (an individual assignment) at the international level (the international benefit), it is necessary to total the benefits of all the countries participating in the cooperation on the particular topic. The integrational benefit of the NTS can be determined according to the formula:

$$B_{int.} = \sum_{i=1}^{n} B_{s.t.c.} \cdot \frac{1}{C_{con.}}, \qquad (17)$$

where $B_{s.t.c.}$ is the total economic benefit of the scientific-technical cooperation for the specific country, in units of national currency; $C_{con.}$ is the coefficient of conversion to the collective currency (convertible rubles for country $i$; 1, 2, 3...$n$ is the number of countries participating in the NTS.

The recommended uniform methodoligical approach and formulas for determining the economic effectiveness of the NTS among the CEMA countries, in our opinion, could be used when the CEMA Committee on Scientific-Technical Cooperation considers the Methodology for Determining the Economic Effectiveness of the NTS Among the CEMA Member Countries, the draft version of which was developed by the Provisional Collective of Scientists and Specialists from the Interested CEMA Countries, and also when determining the economic benefit of the NTS.

Of course, there were many difficulties on the path of developing that Methodology, since many questions of a theoretical and methodological nature with regard to the economic effectiveness of the NTS are moot, and there is not yet sufficient experience in determining that effectiveness. But, despite all the difficulties, the time has come for the adopting of that Methodology. It is necessary both from the point of view of economic theory, and for economic practice. It would render substantial assistance to the ministries and departments, organizations and enterprises of the CEMA countries in computing the economic benefit of the NTS among the CEMA countries on a uniform methodological basis, with the aid of which computation one could determine the most efficient forms of cooperation and could develop measures promoting the intensification of the scientific-technical cooperation, the acceleration of NTP [scientific-technical progress?], and the increase in the effectiveness of the labor productivity of the countries in the socialist community.

## FOOTNOTES

1. Brezhnev, L. I., *Otchet Tsentral'nogo Komiteta KPSS i ocherednyye zadachi partii v oblasti vnutrenney i vneshney politiki* [Report of the CPSU Central Committee and the Immediate Tasks of the Party in the Field of Domestic and Foreign Policy], Moscow, Politizdat, 1976, p 52.

2. Scientific-technical results include: scientific-technical documentation (plans for capital construction; working drawings for the production of machinery, mechanisms, apparatus, devices, and equipment; descriptions of the technology of production; reports on completed scientific-research projects; descriptions of originator's certificates [USSR patents] for inventions; departmental instructions, and other materials), and samples of manufactured and agricultural output.

3. A detailed classification of the forms of scientific-technical cooperation is given in the book: Stepanenko, S. I., *Sovershenstvovaniye nauchno-tekhnicheskogo sotrudnichestva stran SEV* [Improving the Scientific-Technical Cooperation Among the CEMA Countries], Moscow, Mysl', 1974, pp 72-172.

4. Use has also been made of their formulas 3, 5, 6, 9, 10, 11, 14, 15, and 16.

5. As CEMA standards are developed and approved for a uniform system of clearances and seatings, and for a uniform system of construction-planning and designing documentation, the expenditures for the adaptation will be considerably reduced and will constitute a completely insignificant part, which can be subsequently disregarded.

6. The coefficient indicates the number of rubles which have to be expended for the production and transportation of domestic commodities to that country in order to recover one convertible ruble.

7. Novikov, R. A., Shishkov, Yu. V., *Mezhdunarodnaya kooperatsiya kapitalisticheskikh firm* [The Formation of Capitalist Firms into International Cooperatives], Moscow, Mysl', 1972, p 36.

8. Marks [Marx], K. and Engel's [Engels], F., *Soch.* [Works], Vol 23, pp 415-416.

9. See EKONOMICHESKAYA GAZETA, No 10, 1977.

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## INTERNATIONAL ECONOMIC RELATIONS

### USSR'S N. TIKHONOV VIEWS USSR-GDR ECONOMIC COOPERATION

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[Article by N. Tikhonov, candidate member of the CPSU Central Committee Politburo and first deputy chairman of the USSR Council of Ministers: "A New Stage in Economic Cooperation"]

[Text] During the glorious jubilee of the 30th anniversary of the GDR, which was widely marked by the working people of the first socialist state on German soil and by the peoples of the Soviet Union and all the fraternal socialist countries, a document of great political and economic significance was signed--the program for specialization and production sharing between the USSR and the GDR up to 1990. This program, which was highly appraised by Comrade L. I. Brezhnev, general secretary of the CPSU Central Committee and chairman of the USSR Supreme Soviet Presidium, and by Comrade E. Honecker, general secretary of the SED Central Committee and chairman of the GDR State Council, determines for many years to come the basic tasks of cooperation in the sphere of material production, science and technology and forms of collaboration between the two states' organizations in resolving national economic problems common to the two countries.

USSR-GDR economic cooperation, which is an integral and inalienable part of the system of international economic ties within CEMA, is developing successfully on the basis of the principles of socialist internationalism, comradely mutual understanding, complete equality and mutual advantage. This cooperation has assumed on a vast scope at the present stage and acquired qualitatively new content. It takes place in the conditions of socialist economic integration of the fraternal states.

Today 36 percent of the GDR's entire foreign trade turnover is accounted for by the Soviet Union, the GDR in its turn is the Soviet Union's biggest foreign trade partner. The GDR accounts for 12 percent of all our country's exports and 10 percent of its imports. In only 8 years [word indistinct] reciprocal trade turnover more than doubled. The annual volume of trade turnover has now reached R8 billion (in 1949 it was only R236 million).

The Soviet Union is not only a major supplier of raw materials, fuel and semi-finished materials needed for the successful development of the GDR's national economy. At the same time deliveries of finished goods from the USSR to the GDR are increasing every year: Vehicles, equipment and products from the chemical, electrical equipment and electronics industries. Last year goods of this type accounted for one-third of the total volume of deliveries to the GDR.

There has also been a substantial change in the structure of foreign trade deliveries from the GDR to the Soviet Union. Deliveries of chemical equipment, metal-cutting machine tools, forging and pressing equipment, electronic instruments and chemical industry products are increasing. Special mention must be made of the great significance of the products supplied to the USSR by the biggest specialized GDR enterprises, which are unique in many cases and which fulfill orders for the Soviet Union.

In recent years cooperation between the two fraternal countries has been enriched by new forms of foreign economic ties, including cooperation in the sphere of science and technology, the organization of industrial cooperation [kooperatsiya], the joint construction of integrated projects, and also the granting of mutual assistance and technical help in the construction of new enterprises and the modernization of existing ones. "The increasingly close interweaving of the scientific, technical and economic potentials of the USSR and the GDR," Comrade E. Honecker noted, "is a characteristic feature of the socialist planned economy and a vitally important basis for our economic stability. It makes it possible for us to participate in resolving all major tasks and to make use of the broad potential offered by scientific and technical progress--on earth and in space. Our friendship with the USSR is an example of how the international relations of the new type which have grown up in the community of socialist states are manifested in the sphere of the economy."

Scientific and technical cooperation is now being implemented on many topics, both pure and applied. Every year thousands of specialists come together to carry out joint research, exchange scientific and technical information and hold scientific symposiums and conferences. Constant creative ties have become the norm, the requirement for the fraternal parties, state and public organs and research centers in the USSR and the GDR. Thousands and thousands of USSR and GDR working people know each other well and have established the closest contacts.

The national economy of the USSR and the GDR is at a new stage of development. Increasing production efficiency and, on that basis, improving the people's well-being have now been put forward as the main economic task. All this requires a new approach to the resolution of urgent economic tasks and the development of economic ties and gives rise to the need for mutually advantageous, long-term, large-scale cooperation, both bilateral and multilateral, within the framework of CEMA. This is the approach on which the program for specialization and production sharing between the USSR and the GDR up to 1990 is based. "In brief," Comrade L. I. Brezhnev stressed in his speech at the Berlin ceremony, "its essence amounts to this: Everywhere

where it is possible and useful, we pool our resources and production potentials so as to more successfully resolve the most complex problems of economic development."

[LD231129] How can the scientific strength, material resources and production potential of the USSR and the GDR be pooled and combined on the basis of this program in order to resolve specific problems of improving production efficiency?

Specialization measures and measures to increase production concentration up to a level insuring high efficiency were pursued to a certain extent in the course of USSR-GDR economic cooperation even before the signing of the program and proved highly effective. Considerable experience of such cooperation has been accumulated. Highly specialized shipyards and plants--for instance, for the production of passenger cars and refrigerator cars--and enterprises manufacturing automatic telephone exchanges, agricultural vehicles and certain other industrial goods have been created in the GDR.

This makes it possible to introduce highly efficient technological processes and equipment, to make use of progressive forms of production management, to introduce specialization in design and technological bureaus and so forth. The economic result of concentrating production in specialized capacities is highly significant. Thus as a result of the redistribution of production programs between fittings [armaturnyy] plants in Penza and Magdeburg, the increase in series production of many types of fittings up to the optimum level and on this basis the modernization of the enterprises and the introduction of new, high efficiency technological processes, labor productivity has approximately doubled in the sectors concerned.

Cooperation [kooperatsiya] also promotes the task of improving production efficiency. High efficiency installations for the production of "polimir" high pressure polyethylene are now operating in the Soviet Union and the GDR. By joint efforts these installations were created in approximately 3 years less than the time it would have taken to create similar installations in each country individually.

Or another example--production sharing in the development and manufacture of automatic production lines for producing needles used in manufacturing knitwear--an instrument without which knitwear production cannot be organized. The most effective designs used by corresponding enterprises in the USSR and the GDR were combined in the manufacture of these lines. As a result automatic lines have been created and are operating successfully in the USSR and the GDR which are superior in productivity and product quality to the lines manufactured by the best firms in Western countries.

The principle of production sharing, whereby the two countries' best scientific and design solutions and also their production potentials are pooled in a single comprehensive manufacture, in a single technological process, has made it possible to create and to introduce into industry plasma furnaces for highly economical smelting of quality steel, to jointly design, test and organize major series production of high productivity KS-6 beet harvesting combines, to develop and manufacture a line for the production of glass articles with a very high standard of efficiency, to organize on a cooperative basis the mass production of light footwear at the specialized "Floare" factory, jointly created in Moldavia, and to construct a modern plant for technological equipment for the electrical equipment industry. And this is by no means a complete list of the productions in which the potentials of specialization and production sharing have been utilized. Time, considerable physical resources and manpower resources have been saved in this way.

The interests of further development are putting forward increasingly insistently as the most important task the expansion of the spheres of application of specialization and production sharing in spheres where pooling the USSR's and the GDR's resources and production potentials could produce the greatest results.

In 1977, during a friendly meeting in the Crimea, L. I. Brezhnev, general secretary of the CPSU Central Committee and chairman of the USSR Supreme Soviet Presidium, and E. Honecker, general secretary of the SED Central Committee and chairman of the GDR State Council, acknowledged the need to elaborate a program for specialization and production sharing between the two fraternal countries. At all stages of the program's elaboration Comrades L. I. Brezhnev and E. Honecker and the CPSU and SED Central Committees paid constant, acute attention to it. The program was completed, agreed and signed in Berlin on 5 October 1969 during the celebrations of the GDR's 30th anniversary.

The program for specialization and production sharing is intended to promote the stable development of both countries' national economies, increased efficiency of social production, an improved production structure and a higher concentration of production, making it possible to achieve optimum series production of output and on that basis to introduce high efficiency processes and methods of organizing production. The program embraces the whole range of economic, scientific and technical relations and the main strategic directions in the rapprochement between the two fraternal countries' national economies. It includes two groups of measures aimed at improving production efficiency on the basis of cooperation.

[LD231131] The first group consists of measures in the development and production on the basis of both specialization and production sharing of new, high productivity types of equipment, machines and instruments, in the creation of new types of construction and other materials and in improving the technological processes necessary to both countries' national economies. Among these measures are the development of such important processes as the generation of thermal power and electricity with the fuller utilization of solid fuels, and the expansion of potentials for the efficient use of those types of fuel which exist in the greatest profusion.

The further development of specialization and production sharing is inconceivable without deepening cooperation in the sphere of science and technology. That is why the program envisages that USSR and GDR organizations will pool their scientific potentials to an even greater extent than hitherto, and will make more effective use of existing scientific groundwork and production potentials in order to speed up scientific and technical progress in the two countries. The development of specialization and production sharing must to a great extent promote the resolution of the key problem of the development of science and of scientific and technical cooperation--that of speeding up the introduction of up-to-date scientific and technical developments.

Measures planned for the next decade in the sphere of science and technology must insure: The comprehensive and rational utilization of raw materials and fuel and energy resources and the fuller utilization of secondary raw material; the development of more efficient types of machines, equipment and instruments; the creation of modern techniques with a high level of automation; and improving the quality and technical standard of industrial and consumer goods supplied to each other.

Thus, for instance, in the sphere of metallurgy, by the joint efforts of scientists and specialists, technological processes and equipment for the production of steels and alloys will be developed and improved and a new process will be developed for the automated cold-rolling of steel pipes and the rolling of bar steel with protective coatings. Cooperation is being stepped up in the sphere of powder metallurgy and the creation of special and auxiliary materials for the needs of instrument making and electronics. The program devotes priority attention to problems of saving metal, raw materials and materials in the national economy.

The program is also aimed at speeding up the resolution of social questions, planning the creation on a cooperative basis of a whole series of machines and equipment to facilitate workers' and employees' labor. In this connection mention can be made of the agreement included in the program on the creation of robots which can work on the conveyor belt and in jobs where tough conditions exist for workers--dust, high temperatures and so forth. Moreover the program includes an agreement concerning the mechanization of subsidiary and auxiliary processes, that is, those processes where unskilled labor is still used extensively.

Great significance is attached to developing the production of high quality consumer goods.

Even this list of the problems which are to be resolved on the basis of the program shows the volume of organizational work which must be overcome in fulfilling it. In this connection the program provides for the implementation of a second group of measures--organizational measures insuring the pooling of the two sides' scientific, technical and production potentials.

These include cooperation in modernizing enterprises, coordinating the efforts of specialists in both countries to resolve major comprehensive tasks, the creation of new specialized capacities and improving work efficiency at existing ones, and so forth.

An expansion in the scale of specialization work requires even greater stability in fulfilling pledges and unconditionally fulfilling plans for reciprocal deliveries of goods. Expanding cooperation [kooperirovaniye] in scientific and technical developments requires to an even greater degree than at present the acceleration of the introduction of the results of scientific research into production. For this purpose the quest for appropriate forms of cooperation must continue.

The measures outlined in the program naturally cannot provide for all stages in the work that lies ahead or all the details of cooperation. In this connection, on the basis of the principles and goals the program contains, ministries and departments in the two countries are elaborating the "main directions for developing specialization and production sharing up to 1990" in individual sectors of the two countries' national economies.

[LD231133] The nature and main directions of cooperation at a ministry or sector level can be judged, for instance, by how cooperation is to develop in the chemical industry. Scientific technical and economic cooperation between the USSR Ministry of Chemical Industry and the corresponding GDR ministry is now taking place in the direction of the joint development of technological processes, technical documentation, designs for technological installations and equipment and the creation of experimental and production installations by collectives of specialists, and the carrying out of scientific research, experimental and design work in agreed subject areas, on the basis of unified plans.

On the basis of a set of specialization and production sharing measures provided for by the "main directions," ministries and departments in the two countries will begin to develop and conclude appropriate agreements. These agreements will embrace the entire range of specific questions which are to be resolved in the process of cooperation in the sector concerned.

In order to improve the effectiveness of scientific and technical cooperation, it is necessary to further improve the organization of ties in that sphere, to improve material provision for joint research and development and to resolutely discard non-pressing work.

Wide use will be made of such an effective form of cooperation--which has proved itself in practice--as the creation of joint collectives of USSR and GDR specialists for work in the most important avenues laid down by the program, which will make it possible to speed up the fulfillment of concrete targets in the elaboration of new technological processes and equipment, from scientific research, experimental and design work to the creation of major new industrial installations. Joint work by USSR and

GDR specialists and workers will make it possible to utilize more fully the two countries' latest achievements and scientific research potential and thereby to significantly reduce the time taken to develop and assimilate processes and to reduce each side's expenditure on developing them.

The implementation of the program for specialization and production sharing between the USSR and the GDR up to 1990, like the elaboration and implementation of such programs between the USSR and other CEMA countries, will promote further growth in the fraternal countries' economic and scientific potential in the interests of strengthening the socialist community's might and increasing its prestige in the international arena and in the cause of the struggle for peace and international cooperation.

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# INTERNATIONAL ECONOMIC RELATIONS

## USSR-FINNISH COOPERATION IN PRODUCTION, CONSTRUCTION

Moscow PRAVDA in Russian 20 Oct 79 p 4

[Article by Yu. Kuznetsov and M. Podklyuchnikov, PRAVDA Special Correspondents, Helsinki-Moscow: "Facets of Good-Neighborliness"]

[Text] Even the person who comes to Finland for the first time immediately senses the particularly severe fascination of this northern country -- its forests, where the electrical-transmission lines stretch out along the cuts between the firs and the pines; its uncounted lakes, the shores of which are dotted with tremendous boulders; its sparkling-clean cities, where, alongside of painstakingly cared-for old buildings that have retained the spirit of past centuries, modern colossi of concrete and steel rise up, with the sun flashing on their tremendous windows.

In the life of this country, naturally, there are many facets. There are bright ones, which reflect its high industrial development, and the industriousness of its people. But Finland also has its difficulties, which are linked with the fact that it belongs to the capitalist world, and that means that Finland knows unemployment, inflation, and other social ills. However, as compared with other capitalist countries, many of the economic problems do not seem to be so acute here. The reason for this is the fruitful and increasingly stronger cooperation with the Soviet Union.

We visited in Finland various cities, various enterprises and companies, and talked with eminent state figures, with representatives of business circles, and with workers. Everywhere that we went, we heard kind words about the Finnish-Soviet cooperation, its achievements, and its hopeful prospects.

Two hundred kilometers to the north of Helsinki is the country's second largest industrial city, Tampere. One of its enterprises is the Tamrok Plant. The work there is, as they say, really boiling -- the plant is executing the most recent in a series of Soviet work orders. The plant, which belongs to the famous Tampella firm, has accumulated rich experience in business interrelations with foreign-trade organizations and enterprises of the Country of Soviets.

"The extensive ties with the Soviet Union are extremely profitable for us," plant director Y. Mattila says. "We produce drilling equipment. The Soviet Union has a large need for it. It is on a par with the best worldwide models. The ties with your trade organizations and enterprises are an important matter, thanks to which we have no shortage of work orders. In its turn, our firm purchases Soviet machine tools and raw materials. At the present time we are installing an electronic computer -- also Soviet-produced. We obtained it through the joint Soviet-Finnish Elorgdata firm."

That which we were told about at the Tampella firm is only one small link in the chain of Finnish-Soviet cooperation. We became acquainted with another such link, for example, at the petroleum refinery of the Neste firm, which is situated on the seacoast. Soviet tankers carrying crude oil keep coming up to the plant moorages. Thanks to these constant shipments, Finland, unlike many other capitalist countries, is experiencing the manifestation of the energy crisis in a considerably milder form. Still another link is the Lovisa nuclear power plant, at which a Soviet power unit has been installed.

A high level has been achieved in Soviet-Finnish economic exchange: the annual commodity turnover exceeds two billion rubles and has retained a stable tendency to grow. There has been an expansion of the joint construction of various projects: more than 20 such projecs have already been constructed or are under construction on the territory of the USSR and Finland.

"The basis of the economic cooperation between Finland and the USSR," we were told by Ulf Sundqvist, Finnish Minister of Trade and Industry, "is trade. We receive from the USSR commodities that are of great importance for our national economy. And Finland, in its turn, pays for the Soviet shipments by means of the commodities that are needed by the national economy of the Soviet Union. The regular meetings between the trade delegations of both countries are conducted in a spirit of complete mutual understanding."

According to the minister, the economic ties between Finland and the USSR can continue to expand in the future. The firm basis for the growing interaction is the long-term program for the development and deepening of the trade-economic, industrial, and scientific-technical cooperation between the USSR and Finland, which was signed by the General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet L. I. Brezhnev and the President of Finland U. Kekkonen.

Finland is the first European capitalist country with which this kind of long-term program was signed. It mentions, in particular, the great importance of seeking new points of joint application of Soviet and Finnish economic and scientific efforts, of carrying out joint projects involving the formation of cooperatives and specialization in production, including projects in such areas as machine-building and power engineering, including nuclear. In the spirit of this program, one can currently see in the Soviet-Finnish cooperation manifestations of new forms of joint use of efforts and resources. The formation of production cooperatives with Soviet enterprises is enriched by the joint participation in the construction of projects or by the joint venturing of Soviet foreign-trade organizations and Finnish firms in third countries.

We were told about that by the commercial director of the Tampella firm, A. Tilew.

He said, "We have signed with the USSR Ministry of Nonferrous Metallurgy and Mashinoeksport an agreement concerning the formation of production cooperatives. We have in mind the joint production and sale in Finland, the USSR, and third countries of the most up-to-date drilling equipment which is employed in the laying of roads and the drilling of tunnels, at mines, and for many other purposes. It must be said that, even before this, we used to carry out partial cooperative ventures with the plants in Ust'-Kamenogorsk and Alma-Ata. But at the present time everything is taking on considerably more solid and more serious scope. Finnish specialists are very satisfied with the quality of those components of mobile drilling rigs which are being produced by Soviet engineers and workers. We are convinced that our agreement is an excellent example of the implementation of what was agreed upon between Finland and the USSR. The vast technical potential and industrial might of the Soviet Union are known to everyone. As for us, we are putting our commercial knowledge and capabilities into the cooperation. The firm, as you know, has at its disposal daughter enterprises and sales divisions in many countries of the world, including West Germany, the United States, Canada, Japan, Australia. . ."

People in Finland understand that there is a large number of reserves in Soviet-Finnish economic exchange. In addition to the traditional trade, there has been an increase in the important of long-term forms of cooperation. The chairman of the Finnish part of the joint Soviet-Finnish commission on economic cooperation, A. Karjalainen, recently stated in this regard that it is currently necessary to strive to develop the practical forms of cooperation between both countries in such a way that the industrial enterprises are in more direct contact with one another, and to create ties in the area of construction design and the further development of production.

Right now, equipment and instruments that are being sent from our country are being installed on many ships that are under construction in Finland for the Soviet Union. A good example of the developing Soviet-Finnish production cooperation is also provided by the fact that the Kone firm is installing Soviet escalators in the subway that is being build in Helsinki. Scientific-technical cooperation is well under way in the area of developing designs for and producing elevators. Scientific-technical cooperation is also being worked out with the Nokia firm, which specializes in cable production and electronics. The production cooperation between the Stromberg firm and the Novocherkassk Plant in the production of electric locomotives has yielded excellent results. The joint efforts of the Soviet and Finnish sides in the development of electronic medical equipment, and cooperation in the area of the introduction of electronic computer technology, are yielding excellent fruit. In general, in order to raise the Soviet-Finnish cooperation to a qualitatively higher level -- as is stipulated in the long-term program -- much is being done.

The consistent implementation of the principles expressed in the long-term program is an important matter from the point of view not only of the economy, but also of policy. As L. I. Brezhnev noted in connection with the signing of that program, this document "can with complete justification be entered on the credit sign of the large European policy, can be included among the noticeable steps in the implementation of the Concluding Act of the All-European Conference." On his part, U. Kekkonen stated that "both sides view cooperation as a natural part, and even more, as an important part of their long-range plans for development."

The reinforcement and deepening of Soviet-Finnish cooperation serves the further consolidation of the friendly relations between our countries. It makes a very important contribution also to the cause of guaranteeing peace and security, both in the European north and on the entire continent.

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## MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

## METHODS OF STUDYING THE PROBLEM OF LABOR RESOURCES

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 79 pp 83-84

[Review by Yu. Lebedinskiy, doctor of economic sciences, and P. Kovalenkov, candidate of economic sciences, of the book "Voprosy Metodologii i Metodiki Issledovaniya Trudovykh Resursov" [Methodology and Methods for the Study of Labor Resources] by V. V. Onikiyenko. Naukova Dumka, Kiev, 1978, 175 pages]

[Text] The interest of researchers in the problem of manpower resources and in perfecting the methodology and methods for its study is rising as the demographic situation becomes more complex, on the one hand, and the expanding scale of public production, on the other.

The comprehensive and many-tiered nature of the problem calls for coordinated work by specialists in the various sciences. However, it should be noted that at the present time such objectively necessary joint research does not have profoundly elaborated uniform methodological approaches. Naturally, this situation adversely affects the effectiveness with which the various aspects of the problem are studied and hinders the elaboration of scientific suggestions on perfecting the management of the manpower reproduction process.

In this connection the monograph by Doctor of Economic Sciences V. V. Onikiyenko is of unquestionable interest.

The scientific significance of this work is due, above all, to the fact that, to a certain extent, it fills existing gaps in the methodological and methodical approaches to the study of the problem of manpower resources from the position of systems analysis. The initial aspect in this approach is the determination of the essence of the problem of manpower resources under contemporary conditions. Unlike a number of researchers, the author bases his work not on the demographic but the economic aspect, which consists of acknowledging the fact that the growth of production effectiveness in a society developing on a planned basis is insured exclusively by the maximum utilization of the existing economic potential regardless of the demographic situation which may develop in one or another stage of the country's socioeconomic progress. The only accurate conclusion based on the consideration of the problem of manpower resources in this specific aspect is that under the conditions of a declining pace in the growth of the size of manpower resources, public-production effectiveness must be upgraded by changing the ratios between personnel and material factors within socialist expanded reproduction.

The study of manpower reproduction, particularly of its territorial-sectorial redistribution, which is one of the basic directions in the balancing of labor resources, is an important aspect in the developed methodology for the control of manpower resources. The author proceeds from the fact that the main criterion for an effective placement and sectorial distribution of production forces in developed socialist society is the economy of labor and materials, combined with the comprehensive efficient utilization of natural resources. On this level, the systematically organized and economically substantiated release of farm workers and their redistribution among other public-production sectors is ascribed particular significance.

Under contemporary conditions the process of releasing workers from agricultural production has assumed a scale and pace which in a number of cases lead to adverse consequences, particularly to a worsening of the demographic situation and to the development of manpower shortages in rural areas.

As we know, a number of economists base their study of this problem on the characteristics of the demographic dynamics of the rural population. In this connection, measures formulated in a number of parts of the country for a demographic policy aimed at improving the sex and age structure of the rural population and increasing its size are presented as just about the universal means for preventing the aggravation of the scarcity of manpower engaged in agriculture. However, as the work under review justifiably notes, the problem of insuring agriculture with manpower is not demographic but socioeconomic. The author proves that the scarcity of labor resources in a number of rural rayons is created today less by a curtailment of the realm of application of labor as a result of its increased productivity than by the imperfect socioeconomic working and living conditions which have developed in the farms of a number of rural administrative rayons.

In this connection the author thoroughly substantiates the methodological approach to the problem. Since a reduction in the number of people employed in agriculture and, with them, of the rural population at large, is a consequence of the influence of the law of the continually rising social labor productivity in agricultural production, the pace at which agricultural workers are being released and that of the reduction of the rural population should not substantially depart from the growth rates of labor productivity.

The author's computations based on this methodological approach are of definite interest.

The author's development of the familiar methodological approach to the study of the process of manpower reproduction in its qualitative aspect deserves a positive rating as well. Based on the fact that the solution of the manpower problem is found, above all, in improving its quality characteristics, V. Onikiyenko studies the interconnection between the processes of development of the socialist economy and population reproduction, and the problem of optimizing the population's size and sex and age structure, i.e., the reaching of a demographic optimum.

Noteworthy is the author's study of the territorial organization of manpower resources, which represents the most important element of the territorial organization of production forces as a whole. The author emphasizes that the determining base for the territorial organization of manpower resources is less the demographic base of the area than the system of its socioeconomic complex, which determines the functional nature of societal labor resources.

Discussing the nature of the concept of "territorial organization of manpower resources," the author points out the basic directions leading to its perfecting. He molds and defines the category of "efficient territorial organization of labor resources."

In his view, the type of territorial organization of labor resources which contributes to upgrading the effectiveness of utilization of all elements of production forces in the area, in accordance with its geographic, socioeconomic, and demographic characteristics, may alone be considered effective.

It is worth noting, though, that not all the methodological aspects of the problem have been studied sufficiently profoundly. Thus, in our view, the need for making the "economics of manpower resources" a separate branch of the science of economics has been insufficiently substantiated. The system of methods for the study of labor-resource problems should have been defined more accurately.

The monograph considers a number of problems related to the method for studying the process of manpower reproduction as a structural component of the study of the problem of manpower resources as a whole.

It should be noted that the monograph presents not a set of isolated methods but a system of interrelated computations and methodical approaches and means based on substantial statistical data, the latest economic-mathematical methods, and the extensive and justifiable use of computers.

The modifications of the balance method, developed by the author, are of certain interest.

The author has paid great attention to the method for forecasting the level of employment and the utilization of manpower resources. He suggests the use for this purpose of a system of interrelated models structured in such a way that each of them, reflecting a specific range of problems of the formation and distribution of manpower resources, would supplement and refine the parameters of the other models.

The monograph under review considers in detail problems of the information base in the formulation and implementation of models. It defines not only the factors themselves but their yardsticks, ranges of variation, orientational values, and data sources.

Yet, a number of problems have not been properly covered in the monograph. In particular, the methodological problems of the study of current manpower and of the level of the active labor potential of the population have not been presented with sufficient fullness.

Such shortcomings, however, are secondary and do not lower the overall high rating of this work, which unquestionably will be useful to scientific and practical workers studying labor-resource problems.

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## SOCIAL, ECONOMIC EFFECTS OF RURAL MIGRATION

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/Article by B.N. Khomelyanskiy: "Development of the Social Infrastructure and the Stabilization of the Rural Population"]

/Text/ In this article the author considers current features of migration processes, explains the influence of agro-industrial integration on the supplemental demand for manpower and reveals the basic principles and economic consequences of rural migration. The author shows the main trends in the development of the social infrastructure and its effect in overcoming the substantial differences which exist between the city and the countryside and in stabilizing the rural population.

The harmonious development of the personality and the overcoming of substantial differences between the city and the countryside constitute one of the foci of communist construction. In the report of the CPSU Central Committee to the 25th party congress, L.I. Brezhnev outlined the strategy of CPSU social policy at the present stage when talking about the need "to bring the material and cultural-living conditions of city and country life closer together--this is our program requirement."[1]

In long-term planning and forecasting of this process, growing significance is attached to consideration for the movement of the rural population, the influence of which is, on the one hand, great, and on the other hand, somewhat contradictory.[2]

### Current Rural Migration Processes

In the modern era all industrially developed countries have witnessed the movement of the rural population. Active migration from the village to the city also takes place in socialist society. While the total USSR population increased 1.6-fold in 1978 in comparison with 1913, the urban population increased 5.7-fold, while the rural population showed an absolute decline of 25.4 percent. In the period between the 1959 and 1970 censuses, the total increase in the urban population capable of working amounted to 19 million people; 68 percent of this number can be accounted for by migration from the village and from the administrative-territorial formations near it. Over the last 10-15 years the net result of the migratory exchange between the village and the city has amounted to approximately 1.5 million people, including about 1 million of working age.

The village to city migration does not have to disturb the balance of labor resources in agriculture or provide advantages to other spheres of production activity by creating local economic difficulties. It is progressive as long as output is increasing and there is an appropriate level of employment; the loss of manpower is compensated for by a corresponding increase in the effectiveness of agricultural labor. While the productivity of public labor increased 10.3-fold between 1940 and 1978, the productivity of labor in agriculture (public production) increased only 4.3-fold. The gross public product of the nation during the corresponding period increased 12.8-fold, while agricultural output increased 2.6-fold.[3]

Under present conditions the job is not to artificially slow down the outflow of manpower from the village but rather to ensure that it is distributed among sectors and regions in a way that permits the efficient functioning of public production.

The accelerated outflow of workers is taking place in republics and regions which are experiencing a demand for manpower: the Northwestern, Volgo-Vyatskiy, Central, Far Eastern, Western Siberian and other economic regions. According to data from sociological investigations, the agricultural enterprises of Novosibirskaya Oblast (which is representative to a significant degree of all of Western Siberia) had a labor deficit which grew from 8 percent in 1966 to 14 percent in 1971. At the same time there has also been an increase in the manpower shortage in transportation and communications, at household service enterprises and institutions, in public catering and health care.[4]

Young people constitute the most mobile section of the rural population. Because of the opportunities for accelerated vocational training, industry, construction and other non-agricultural branches of the economy are displaying an increased demand for young people. A high degree of mobility is characteristic of machine operators (workers with a range of skills). Economists calculate that in the coming 10-15 years the demand for rural machine operators will double from 4 million to 7-8 million. During the years 1971-1977 the number of machine operators trained for agriculture amounted to 7.4 million, while the actual increase in the number of machine operators working in agriculture amounted to 813,000.[5] The number of machine operators in rural localities is hardly increasing at all. In fact, training more of them hardly compensates for the loss of machine operators into other sectors of the national economy.

Migration leads to substantial changes in the structure of the rural population: the percentage of workers in the most active, working age bracket (20-49) is decreasing; the proportion of older people is growing, which in general creates a less favorable demographic situation, and a significant outflow of skilled labor is observed. The reduction of the labor potential has a negative effect on the process of expanded reproduction in agriculture. Additional factors, which increase the negative influence of rural migration, also arise.

## The Growing Labor Demands of the Agro-Industrial Complex (AIC)

In our view, one of the inadequacies of the research into this problem lies in the tendency to identify the rationality of releasing workers directly from agricultural production with the advisability of rural migration. The new socio-economic phenomena which are taking place in the village of today are not being taken into account.

The further socialization of production in developed socialist society is expressed in the planned agro-industrial integration. This process is acquiring first-rank significance in the elimination of the substantial differences between the city and village and in the real opportunities to shift agriculture onto an industrial basis.

The AIC, as is well known, is divided into three main spheres:
--the branches of industry which provide agriculture with the means of production;
--immediate agricultural production (land cultivation and animal husbandry);
--the branches involved in the procuring, the commercial preparation, the processing and transporting of agricultural products.

According to data for the intersectorial balance, the 1972 figures show that the first AIC sphere employed 4.8 million workers, or 10.9 percent of the total 43.9 million AIC workers; the second sphere employed 29.0 million (66.2 percent), and the third sector employed 10.1 million (22.9 percent).

In comparison with 1959, AIC employment had increased by a total of 1.7 million persons (+4 percent), while the figure for the national economy was 41.6 percent.[6]

The various AIC spheres display labor-demand tendencies which are by no means the same. Along with a certain stability in the demands of the first sphere (taking into account the growth of labor productivity), the number of workers employed directly in agricultural production is declining at a rapid rate; according to the data for the intersectorial balance, it fell from 77.2 percent in 1959 to 66.2 percent in 1972. By looking at particular years the process can be seen with even greater force. In 1940 the agrarian sector of agriculture employed 50 percent of the workers in public production, it employed 30.0 percent in 1965 and 21.6 percent in 1977.[7]

A more detailed analysis of the movement of labor resources in the AIC provides evidence that the demand for labor in increasing in those spheres which are related in one way or another to agricultural production (the third sphere). Approximate calculations show that with the shift of agricultural onto an industrial footing, the other two spheres of the AIC will require two employees for every one engaged directly in agriculture.[8] The third sphere's growing demand for additional labor presumes the construction and development of enterprises in rural localities. The increase in the output of light and the food branches of industry have been achieved up to now primarily through increases in labor productivity. In 1977, in comparison with 1970, light industry and the food industry showed an increase in gross production volume amounting to 35 and 33 percent respectively, while labor productivity increased by 30 and 27 percent.[9]

Agro-industrial integration is being achieved in agriculture through the following trends: the creation of enterprises consisting of more than one economic unit (organizations); the formation of agrarian-industrial enterprises (sovkhoz-plants); state construction of industrial enterprises in rural localities and increases in their interaction with agricultural production, i.e., the creation of agrarian-industrial associations.

All these units of the AIC, which are developing rapidly in rural areas, present demands for additional manpower. The number of these inter-unit enterprises, organizations and associations increased from 4,554 in 1970 to 7,706 in 1977 (a 1.7-fold increase), while the average number of workers which they employed increased more than 5.6-fold from 78,700 to 447,900. The labor demand experienced by inter-unit construction organizations is growing at a rapid rate: between 1970 and 1977 the number of these organizations increased from 865,700 to 1,153,600.[10]

Based on the indisputable fact of increasing agro-industrial integration in the sphere of agricultural raw material processing, it can be presumed that in the near future there will be a merging of the individual branches of agriculture and the processing industry, which will provide the foundation for the emergence of complexes for the production of final products, complexes which will be located in rural areas.

The creation of an AIC will make it possible to improve the utilization of labor resources by reducing the seasonality of agricultural production.

The demand for labor increases as a result of the need to develop a production infrastructure in rural areas. "We must not fail to take into account," noted L.I. Brezhnev at the 25th party congress, "the fact that in the coming period we will have to devote more resources to the accelerated development of transportation, communications, the system of material-technical supply, to everything that is included under the term infrastructure. In the past, we simply were not able to devote the necessary attention to many of these spheres, in particular to road construction and the provision of warehouse facilities."[11]

The resolution of these problems is possible only if the active participation of the rural population itself is secured and local skilled labor is drawn into the AIC sphere in larger amounts.

All this forces one to take a different attitude toward the premise, which previously seemed indisputatable, that the migration of the rural population is a totally progressive phenomenon. Moreover, it is the stabilization of the population in rural areas (along with significant growth in labor productivity) which may contribute to the further agro-industrial integration and successful resolution of the fundamental problems of communist construction. As a result there arises the need to reveal the main reasons for rural migration and provide the basis for certain trends in the overcoming of the undesired consequences of this emigration.

## The Effect of the Social Infrastructure on the Stability of the Rural Population

Current problems related to the emigration of the rural population, the clarification of the reasons for this phenomenon and the search for the optimal correspondence in the rational utilization of the total labor force occupy a relatively significant place in the economic literature.[12]

Sociological investigations provide evidence that the redistribution of labor resources is taking place in a manner which is not in the least disorderly. The reasons for the redistribution of manpower, which outwardly seem to be very diverse, can be broken down quite clearly into economic, cultural-domestic, and socio-psychological categories. The first group includes those which are formed in the production and distribution of the social product and depend on the economics of auxiliary farming, trade turnover and labor conditions.

The second group of reasons for emigration results from the degree of development in the social infrastructure: the availability of well built housing with modern conveniences, as well as communal and domestic services, communication services and transportation (the so-called infrastructure of daily life); opportunities to satisfy the growing social and spiritual needs--education, culture, health care (the so-called socio-economic infrastructure).

The third group includes subjective reasons: attitude toward agricultural labor, personal motives, family and other circumstances.

The attempt to stabilize the rural population by non-economic methods is not achieving the desired goal. It is not the administrative management of processes which must be based on principle, but rather the effect on the conditions which form the personality and determine the reasons for a person's behavior which must be principled, i.e., the socio-economic environment in which a person lives and works is what must be influenced.

In a developed socialist society the differences in the material provisions for the various social groups of the population are drastically reduced. Betweeen 1965 and 1978 the average monthly wage of blue- and white-collar workers increased by 65.8 percent (from 96.5 to 160 rubles) including a 91.6 percent increase (from 74.6 to 143 rubles) at sovkhoz's. The labor payment in kolkhoz's increased by 95.5 percent from 2.68 rubles to 5.24 rubles for one man-day worked. In the Tenth Five-Year Plan these trends will be developed further: the labor payment for blue- and white-collar workers will grow 17 percent, and it will increase 26 percent for kolkhoz members. The gap in the labor payment for kolkhoz members and blue-collar workers will have been reduced by 1980 to nearly half of what it was in 1960--from 35.1 to 68.2 percent.

The level and structure of rural and urban consumption are coming closer together. In 1950 the retail trade turnover per rural inhabitant was approximately 5-fold less than it was for an urban dweller (80 rubles and 383 rubles), while in 1977 in was 2.4-fold less (439 rubles and 1,129 rubles). According to data from various surveys, the rural population buys about 38 percent of goods in the city as well. The incomes from auxiliary farms substantially add to the material well-being of the rural population. Statistical data and surveys testify that the degree of material well-being has ceased to be the fundamental reason for rural emigration. For the rural population in a developed socialist society the comprehensiveness of need satisfaction is expressed in the necessity for priority growth in those areas which contribute to the harmonious development of the personality--to the formation of their intellectual, moral, and physical capacities. An accelerated rate of change in the social infrastructure--the system of educational, cultural and health care institutions, and the construction of housing and community facilities in the village--is acquiring top-priority significance.

The decisions of the July (1978) CC CPSU plenum devote particular attention to the construction of facilities to serve the community's cultural and domestic needs as one of the most important trends in the stabilization of the rural population. L.I. Brezhnev emphasized that "while taking into account the importance of keeping workers in the village, especially machine operators and specialists, it would be possible to begin a certain redistribution of total resources in favor of nonproductive construction for the village."

In studying the problems of how to equalize the living standards in rural areas, it should be noted that the range of statistical indicators which are traditionally used for this purpose were developed relatively recently. A majority of the indicators characterize the extensive changes in the level which has been achieved in the development of factors in the social infrastructure. An analysis of the statistical data provides evidence that for some indicators--the number of teachers and children in schools, movie projectors, clubs, library books per capita--the village is even ahead of the city; for other indicators--

the number of radios, newspapers and magazines--the city has an insignificant advantage; for a third group of indicators--the number of television sets and domestic services--the city's advantage remains but is growing less. From the viewpoint of visibility of the phenomena, these data arouse no doubt. However, with a more detailed analysis it is essential to take into account two factors: the qualitative change in the spiritual needs of the rural population and the real opportunities to satisfy these needs with regard for the characteristics of today's rural population.

In terms of the number of pupil places the rural school actually exceeds the urban school. However, the qualitative indicators for the functioning of the rural school are still far behind those of the urban school. The rural elementary school is 5-fold smaller than the urban equivalent, the eight-year school is 3.3-fold and the secondary school is 2.4-fold smaller. Out of 117,000 rural schools 45,700 are small elementary schools.[13] Their size makes it impossible to provide the teaching collective with an academic load based on academic speciality, nor can advantage be taken of the division and cooperation of pedagogical labor. This kind of situation effects the quality of the staff, the quality of academic organization, and it makes it more difficult for rural school children to enter higher and other specialized academic institutions.

Rural areas have a need to develop vocational education. It is practicable to used the best kolkhoz's and sovkhoz's as the basis for the organization of tekhnikums which are capable of training specialists with a middle level of skills. The branches of rural vocational-technical schools held in specialized agricultural enterprises constitute a promising form of education.

In the same way that the system of education helps to ensure a supply of new employees and the stabilization of the population, the degree of development in the spheres of culture and health care also has an effect. As noted in the decree of the CPSU Central Committee and the USSR Council of Ministers "Concerning Measures to Further Improve the Provision of Cultural Services for the Rural Population"(November 1977), a significant number of rural settlements do not have permanent cultural-educational institutions, while "the content of the activities organized by many rural clubs, libraries and other cultural institutions do not fully meet todays's requirements for ideological-indoctrination work, or the growing cultural demands of the village workers."[14]

The following investment principles are becoming the real foundation for the consolidation of the material base underlying cultural-educational institutions in rural areas:

--when developing the plans for the economic and social development of the union republics, capital investment is to be allotted as a first priority to the construction of cultural institutions in the village, to the establishment of rural cultural complexes.

--the right of enterprises to build clubs and houses of cultures with a capacity of up to 600 seats on the basis of standard plans; this can be done through the use of capital investments allotted for the construction of facilities for production purposes (without reducing the amount of production capacities being put into operation);
--broader development and comprehensive utilization of portable equipment (portable clubs, book mobiles, portable film projectors) to provide cultural services to small communities in which there are no permanent cultural facilities).

The implementation of these and a number of other economic and organizational measures will make it possible to satisfy more fully the spiritual interests of rural workers.

Medical service for the rural population is provided on the basis of the national principles, and this helps to bring the level of health care services delivered to rural and urban areas closer together. The number of hospital beds per 1,000 population in rural areas comes close to the urban norm (9.9 in comparison to 11.7). But the distance between settlements, as well as the predominance of small health care institutions in rural areas (dispensaries and divisional hospitals), in practice make it more difficult to provide quality services in accordance with the demands of the population.

There is also a substantial difference in the number of children in preschool institutions. In 1977 city residents had 61 children in preschool institutions for every 1,000 population, while rural residents had 29 children enrolled. Also, the birth rate in the village exceeds similar indicators for the city (by 12 percent in 1977). The lack of the necessary number of children's institutions frequently makes it difficult to bring young mothers into the work force for public production.

In the present period it is important to accelerate the rate of development for enterprises and institutions to provide everyday services in rural areas. In 1965 the volume of everyday services per rural resident amounted to 24.5 percent of the everyday services used by the urban resident, and in 1977 the figure was 66 percent. In the Tenth Five-Year Plan a 1.5-fold increase in the total volume for the realization of everyday services of the population is called for, and for rural areas the will be a 1.7-fold increase.

Despite the total growth in the volume of everyday services there is still a substantial gap between the level provided in the country and the city norms. In rural areas the level of services for mending and custom tailoring of clothing is 2.5-fold lower than the city level; for the repair of equipment and household appliances it is 3.4-fold lower; for dry cleaning and dyeing it is 7-fold lower, and for laundry services it is 10-fold lower.[15]

Until recently the basis for everyday services in rural areas was the rayon personal service combine.. Since they have only small workshops available, they cannot provide the population with services at an up-to-date level. Instead, many oblasts have created rayon production boards for everyday services (RPB), which take in and deliver orders through comprehensive intake points (CIP). The orders are relayed to specialized enterprises for fulfillment.

In general, though, despite certain difficulties, the rural service infrastructure is called upon to fulfill its social role to increase free time resources, to improve the cultural level of daily life and to create favorable conditions for the development of the personality.

In the entire complex of measures to stabilize the rural population, top priority belongs to the program to provide housing equipped with modern amenities. The scale of residential construction in rural areas grows with each year. During the Ninth Five-Year Plan and the beginning of the Tenth (1971-1977), residential buildings with a total area of 228 million $m^2$ have been constructed (43 percent of the living space built in cities).

At the same time we must not fail to to take note of those difficulties which exist in the program to provide residential construction. The population is experiencing a sharp demand for building materials, which are sold through consumer cooperatives; and in the rural areas the individual sector has greater significance (it accounts for approximately 70 percent in sovkhoz's and 95 percent in kolkhoz's). In 1977, the rural population was sold smaller amounts of certain materials than in 1965: 339,000 compact $m^3$, standard buildings with 617,000 $m^2$ of total area, parts for standard homes occupying 2,854,000 $m^2$ of total area, (these figures represent the shortfalls in comparison with 1965).[16]

These problems in the development of the social infrastructure can be solved on the scale of major populated areas. It is almost impossible for small rural settlements to carry out construction of modern cultural-service facilities (and it would be unwise even if they could), and consequently to satisfy more fully the social and spiritual demands of the rural population. And it is these demands which are the main sources of rural migration.

The number of rural populated areas declined by 304,000 (from 772,000 to 469,000) in the USSR between the 1959 and 1970 population censuses. Nonetheless, according to the data from simultaneous studies carried out by the RSFSR Central Statistical Administration in 1972, the number of rural settlements in the Russian Federation with less than 100 residents is 58 percent of the total number, but they contain only 9,4 percent of the republic's population. On an average, for every kolkhoz and sovkhoz there are 10-13 small settlements, where it is practically impossible and economically inadvisable to create a far-flung system of institutions comprising the social infrastructure.

Capital reconstruction of a village requires enormous resources (within the framework of one farm with an average level of development, and 15 settled areas, it would cost no less than 10 million rubles). And for now society cannot allot resources of this magnitude to rebuild all the small populated areas in the near future. The resolution of this problem is obviously related to agro-industrial integration.

The most intensive processes of rural population stabilization are taking place under new, complex and dynamic forms of settlement--agglomerations and their zones of influence, which are gradually being transformed into broader systems--urbanized regions. The development of agglomerations presupposes a far-flung road and transportation network, which is required in order to realize the social, cultural and other advantages of these units. The most realistic path to the stabilization of the population is through the gradual inclusion of rural territories into large urbanized regions, and the development of agro-industrial integration contributes most intensively to this. This approach will remove the question of whether it is essential to provide an absolute equalization in the level of services provided to the city and the countryside (calculated for an equal number of inhabitants) by enterprises for everyday services, trade, health care institutions, etc., and it opens up the path to bringing closer together the consumption levels for services of the social infrastructure. The dialectically inter-related process of stablization of the rural population and further agro-industrial integration, which is being carried out under present-day conditions, is becoming one of the significant trends in communist construction.

## FOOTNOTES

1. L.I. Brezhnev, "Leninskim kursom" /The Leninist Course/, Moscow, Politizdat, 1976, Vol 5, p 503.

2. We have in mind the discovery of the patterns of migration by the rural population, its evaluation from the viewpoint of the current problems of agro-industrial complex formation and the further development of agricultural production.

3. Calculated according to "SSSR v tsifrakh v 1978" /The USSR in Numbers in 1978/ Moscow, Statistika, 1979, pp 24-27.

4. V.N. Ladenkov and A.A. Noskov, "Problemy razvitiya sel'skogo khozyastva Zapadnoy Sibiri" /Problems in the Development of Western Siberia's Agriculture/, Novosibirsk, Nauka, 1977, pp 76-77.

5. Calculated according to "Narodnoye khozyastvo SSR v 1977" /The USSR National Economy in 1977/, Moscow, Statistika, p 448.

6. Calculated according to "Narodnoye khozyastvo SSSR v 1959" /The USSR National Economy in 1959/, Moscow, Statistika, 1960, pp 423, 585; "Narodnoye Khozyastvo SSSR v 1972, 1973" pp 388, 503.

7. "Narodnoye khozyastvo SSSR v 1977" /USSR National Economy in 1977/, pp 294, 377.

8. I.V. Kurtsev, "Nauchno-tekhnicheskiy progress v sel'skom khozyastve /Scientific and Technical Progress in Agriculture/, Moscow, Kolos, 1978, p 166.

9. Calculated according to "Narodnoye khozyastvo SSSR v 1977" /The USSR National Economy in 1977/, pp 179, 190.

10. Calculated according to "Narodnoye khozyastvo SSSR v 1977" /The USSR National Economy in 1977/, pp 201, 279, 282-283.

11. L.I. Brezhnev, "Leninskim kursom," Vol 5, p 497.

12. The sociological investigations of the Sector for Social Problems of the City and the Country of the Institute of Economics and the OPP /expansion unknown/ of the Siberian Division of the USSR Academy of Sciences (T.I. Zaslavskaya, corresponding member of the USSR Academy of Sciences, director), have been especially fruitful. (See "Migratsiya sel'skogo naseleniya" /Migration of the Rural Population/, Moscow, Ekonomika, 1970; "Migratsiya sel'skogo naseleniya" /Migration of the Rural Population/, Moscow, Ekonomika, 1972; "Sotsial'no-ekonomicheskoye razvitiye sela i migratsiya naseleniya" /Socio-Economic Development of the Village and the Migration of the Population/, Novosibirsk, Nauka, 1972; "Sotsiologicheskiye isseldovaniya sibirskoy derevni" /Sociological Investigation of the Siberian Countryside/, Novosibirsk, Nauka, 1975, and others).

13. Calculated according to "Narodnoye obrazovaniya, nauka, i kul'tura v SSSR" /Education, Science and Culture in the USSR/, Moscow, Statistika, 1977, pp 28-31.

14. "KPSS v rezolyutsiyakh i resheniyakh s"yezdov, konferentsiy i plenumov TsK (T.12)" /The CPSU in Resolutions and Decisions of Congresses, Conferences and Plenums of the Central Committee (Vol 12)/, Moscow, 1978, p 57

15. Calculated according to "Narodnoye khozyastvo SSSR v 1977" /The USSR National Economy in 1977/, Vol 7, pp 481, 483.

16. Calculated according to "Narodnoye khozyastvo SSSR v 1977" /The USSR National Economy in 1977/, p 462.

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## AMENDMENTS TO RSFSR LAW ON PUBLIC EDUCATION

Moscow VEDOMOSTI VERKHOVNOGO SOVETA RSFSR in Russian No 41, 11 Oct 79 pp 799-801

[Ukase of the Presidium of the Supreme Soviet of the RSFSR: "Amendments and Additions to the RSFSR Law on Public Education"]

[Text] 1029 Amendments and Additions to the RSFSR Law on Public Education.

The Presidium of the Supreme Soviet of the RSFSR decrees:

In order to bring the Law of the Russian Soviet Federated Socialist Republic on Public Education (VEDOMOSTI VEKHOVNOGO SOVETA RSFSR, 1974, No 32, Article 850) into conformity with the USSR Constitution, the RSFSR Constitution, and the 14 August 1979 Ukase of the Presidium of the Supreme Soviet of the USSR entitled "Amendments and Additions to the Fundamentals of Legislation of the USSR and Union Republics on Public Education," the following amendments and additions to this Law are made:

1. The second part of Article 3 is to be worded as follows:

"This right is insured by the free provision of all types of education, the implementation of universal compulsory secondary education of young people, broad development of vocational-technical, secondary specialized, and higher education on the basis of a tie between studies and life and production; the development of extension and evening education; granting state subsidies and benefits to students at secondary and higher educational institutions; free provision of school textbooks; the possibility of studying at school in one's native language; creation of conditions for self-education; the organization of various forms of production training and raising qualifications."

2. Points 1, 2, and 5 of Article 4 are to be worded as follows:

"1) Equality of all USSR citizens to receive education regardless of origin, social and property status, racial and nationality affiliation, sex, language, attitude toward religion, nature and character of employment, residence, and other circumstances;

"3) Implementation of universal compulsory secondary education of young people;"

"5) Free provision of all types of education, maintaining some secondary students on full state support, free provision of school textbooks, stipends for students at secondary and higher educational institutions, granting them established benefits, and rendering other material assistance."

3. Article 5 is to be supplemented with a first part reading as follows:

"In conformity with the Constitution of the USSR and Constitution of the RSFSR there is a single system of public education in the RSFSR which is being refined and insures the general educational and vocational training of the citizens, promotes the communist indoctrination and mental and physical development of young people, and prepares them for activity in society."

4. Article 9 is to be worded as follows:

"Article 9. The Jurisdiction of Local Soviets of People's Deputies in the Field of Management of Public Education.

"The jurisdiction of local Soviets of People's Deputies of the RSFSR in the field of management of public education is defined by the legislation of the USSR and RSFSR.

"The executive committees of local Soviets of People's Deputies manage the educational and indoctrination establishments subordinate to them, take steps toward the development of the network of such institutions, their correct siting, and providing them with physical facilities for education, insure universal compulsory secondary education of young people, take steps to strengthen the tie between education and production and improve labor indoctrination and vocational guidance, monitor provision of free textbooks to students at general educational schools, manage preschool and extracurricular education, and assist vocational-technical, secondary specialized, and higher educational institutions located in the territories of the Soviet in their work.

"The executive committees of local Soviets of People's Deputies keep records of school-age children, distribute the universal primary education fund in the established manner and monitor its use, coordinate the activities of state enterprises, institutions, organizations, kolkhozes, other cooperative organizations, and other social organizations in rendering assistance to educational and indoctrination establishments, and decide other questions within their jurisdiction."

5. Article 18 is to read as follows:

"Article 15. The Organization of Children's Preschool Institutions. "Children's preschool institutions are organized by the executive committees of rayon, city, settlement, and rural Soviets of People's Deputies and, with their permission, by state enterprises, establishments and organizations, kolkhozes, other cooperative organizations, and other social organizations.

"Permission to organize children's preschool institutions is given by the executive committees of Soviets of People's Deputies at the place where the children's preschool establishment is being organized."

6. In the first part of Article 22 the words "universal secondary education of the growing generation" are to be replaced by the words "universal compulsory secondary education of young people."

7. In the second part of Article 23 the words "national okrugs" are to be replaced by the words "autonomous okrugs."

8. In the title and text of Article 46 the word "statutes" is to be replaced by the word "statute."

9. In the first part of Article 81 the words "on a national economic plane" are to be replaced by the words "on the plane of economic and social development."

10. In Article 83 the words "universal compulsory eight-year education" are to be replaced by the words "implementation of universal compulsory secondary education of young people."

11. In the title of Section XIV remove the words "and Agreements."

12. Article 85 is to read as follows:

"Article 85. International Treaties.

"If the USSR has established by international treaty rules that differ from those contained in the legislation of the USSR on public education, the rules of the international treaty are applied. A similar procedure operates in the case of a discrepancy between the law of the RSFSR and an international treaty concluded by it."

13. In the fifth part of Article 8, Article 15, and the second part of Article 45 remove the words "Council of Ministers."

14. In Articles 10, 13, 31, 43, 81, and 82 the word "cooperative" is to be replaced by the words "other cooperative ."

15. In Articles 8, 15, 29, 30, 49, 54, 60, and 73 the words "deputies of working people" and "ministries and departments" are to be replaced,

respectively, by the words "people's deputies" and "ministries, state committees and departments."

M. Yasnov, chairman of the Presidium of the Supreme Soviet of the RSFSR
Kh. Neshkov, secretary of the Presidium of the Supreme Soviet of the RSFSR

(Moscow, 8 October 1979)

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# MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

## VARIOUS STEPS TAKEN TO REFINE SYSTEM OF POST-GRADUATE STUDY

Moscow IZVESTIYA in Russian 20 Nov 79 p 3

[Article by N. Krasnov, first deputy minister of higher and secondary specialized education of the USSR: "After the Diploma — Continuing Education for Specialists"]

[Text] The program objective of our party is to shape a new kind of human being. At a recent ideological conference it was emphasized that work to accomplish this objective is closely tied to solving a group of social, political, and economic problems. Among the most important of them is raising the qualifications of and retraining specialists and managers in the national economy.

With the current rate of development of science and technology the specialist must be studying practically all the time that he is employed. However, quantitative enlargement of knowledge by no means exhausts the concept of continuing education. This also means getting to the essential features of new phenomena. Large volumes of surplus information makes self-education more difficult. That is why a system is needed. The systems approach to education offers possibilities for flexible, operational control of raising worker qualifications.

Acquired knowledge is becoming obsolete so fast that it is difficult to picture normal work by a manager or specialist today without regularly bringing this knowledge into conformity with the demands of life and production. Without raising qualifications it is hardly possible to introduce new scientific and technical ideas and progressive know-how and to accomplish the strategic objective of combining the achievements of the scientific-technical revolution with the advantages of the socialist economic system. Finally, the indoctrination aspect is very important.

Raising qualifications and retraining are difficult work accompanied by major mental and psychological strain. After all, those being sent to study are not just young people who have graduated from higher educational institutions and tekhnikums fairly recently, but also experienced, mature people occupying important positions, burdened with many work, public, and home duties. To leave production work for studies (and this form is, of course, much more practical and advisable, although, unfortunately, most specialists do not do it at the present time), a person must tear himself away from his everyday concerns for a time, and sometimes travel away from home and become a student once more. Moreover many specialists and managers with long years of experience are firmly and sincerely convinced that they understand their production work very well, manage it correctly, and would only waste time in school. Administrative measures have to be used quite often to influence them. But the main thing with which we want to attract people is the quality of education.

There are various types of postgraduate education. Retraining is one thing, where an engineer, doctor, or agronomist out of production necessity needs knowledge from other fields of science and technology. This is where we include study in new, promising areas of science and technology. As a rule, these fields enjoy the most advanced educational facilities.

Raising qualifications is another form of supplementary education which concerns a much larger number of specialists and managers. The country has 68 institutes for raising qualifications and 100 branches, as well as 201 institutes for advanced study by doctors and teachers. In addition, there are 500 departments at higher educational institutions. Ministries, enterprises, and establishments offer courses. Each year about 2 million people engage in this kind of study.

However, we must admit that behind the impressive figures the level of work is sometimes not very high. With such large numbers of students it is difficult to insure good work. But this is a pressing problem today and we are working hard on it. Thus, the USSR Ministry of Higher and Secondary Specialized Education has now defined periods of study for different categories of workers, minimum study loads, and the like. To raise the quality of transmission of knowledge we are deciding the important issue of organizing, in large industrial centers, intersectorial institutes for raising qualifications at large engineering-technical colleges, and broadening the influence of departments that train organizers of industrial production, construction, and planning in regions with intensive industrial development.

The students at them are specialists who, in terms of their work, vocational, and moral qualities could be promoted to management positions, but only if they acquire the knowledge necessary for management work. They leave their production jobs for school and studies take account of specific sectorial features. Of course, heightened requirements are made of the student body. The classes are conducted by qualified teachers who insure a high level of management training. These departments have already trained 12,000 people sent by 78 ministries and departments and 70 percent of the graduates have been promoted to higher positions.

The USSR Ministry of Higher and Secondary Specialized Education, which has been assigned to exercise methodological guidance over the system for raising qualifications, has set up a special administration, plus an interdepartmental council to coordinate the efforts of sectorial ministers and departments. The council includes deputy chairmen from USSR Gosplan, the USSR State Committee on Science and Technology, USSR Gosstroy, the USSR State Committee on Labor and Social Problems, deputy ministers, members of boards of directors, prominent scientists, and rectors. The council has been given broad authority which essentially makes it an administrative agency with the primary objective of planning education rationally. The planning principle is very significant here.

The council devotes considerable attention to working out scientifically substantiated principles of supporting education and to a uniform structure of curricula and syllabi in the social-political, economic management, and legal disciplines.

We assign an important role to economic management and legal training, with the emphasis being placed on the methodology and practices of planning production, accelerating scientific-technical progress, and raising labor productivity and product quality. Applied training takes account of changes in the forms and methods of practical application of science. The center of the specialist's activity becomes control of complex systems in which natural factors, contemporary technical equipment, and people interact.

The objective of this entire system of education is to allow the specialist to keep his practical scientific background up to date. However, raising qualifications cannot be viewed as simply a kind of compensatory mechanism. Moreover, with the fairly limited periods of study it is impossible to tell students everything new. Therefore, special training concentrates on key problems and provides guidance for independent work.

There are distinctive characteristics in the training of management workers. Given the scientific-technical revolution problems that demand unusual, independent decisions are constantly arising. The manager's work increasingly requires initiative and combining the science and art of control. Therefore, educational institutions develop the students' desire to take a creative approach to every specific problem.

Therefore, the organization of educational work and the very nature of the teacher's dealing with the class are oriented to using the rich life and production experience of the students. Class trips, discussions at leading enterprises and exhibits, reviewing actual production and economic situations, and business games are successfully supplementing traditional teaching methods.

At certain institutes students do graduation projects in which they make technical-economic analyses of the work of their enterprises, study the level of organization of labor, production, and management, identify reserves, and figure the economic advisability of planned steps using a special methodology. Many of these projects are implemented. This practice deserves special attention.

A significant number of institutes and departments for raising qualifications are major educational centers with good physical facilities and the latest electronic computer technology. They have accumulated experience in scientific organization of education. Nonetheless, a great deal of effort is required for the system of raising qualifications to work in the way that our national economy needs it to work. Low-powered schools should certainly be shut down and the capacities of the larger educational institutions offering daytime studies should be increased.

Raising qualifications with temporary departure from the production job should become the primary form of postgraduate study. Many sectorial ministries and departments must take absolutely urgent steps to provide their training positions with modern equipment, computers, and technical training devices. Broader, more daring scientific research must be undertaken in the area of raising qualifications in order to define the optimal content and most rational organizational forms and methods for it.

Vocational training for specialists and economic managers should be a continuous process. In the future we must not only establish all possible forms of supplementary education and retraining and strengthen and develop them, but also provide guidance and help for every specialist who needs to update his knowledge. These functions should be undertaken by the institutes, departments, and schools for raising qualifications which, despite some weak points, can nonetheless be considered an established system of postgraduate study. This is a new type of education, born of the scientific-technical revolution.

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# MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

## NEW WAGE REGULATIONS FOR ANIMAL HUSBANDRY SPECIALISTS DESCRIBED

Moscow SOTSIALISTICHESKAYA ZAKONNOST' in Russian No 8, Aug 79 pp 38-39

[Article by Ye. Panova, Senior Scientific Associate at the All-Union Scientific Research Institute of Soviet Law, Candidate of Juridical Sciences, Honored Jurist of the RSFSR: "The Payment of Animal Husbandry Specialists"]

[Text] The standard regulation on the payment of workers of sovkhozes and other state agricultural enterprises which was approved by the [illegible] February 1978 decree No. 54/P 4-5 of the State Committee for Labor and Social Questions of the USSR Council of Ministers and the Presidium of the All-Union Central Council of Trade Unions establishes a special procedure for paying the workers of state animal husbandry complexes which differs from the procedure for paying animal husbandry specialists on sovkhozes and other agricultural enterprises, for example, horse farms, poultry factories (BYULLETEN' GOSKOMTRUDA SSSR, NOS. 8-10, 1978).

The state animal husbandry complexes are a new type of agricultural enterprise. With their shift to an industrial basis the character and specific nature of work and the sphere of its application have undergone an essential change in them. In accordance with this, the procedure for the payment of labor has been changed. In contrast to the ordinary animal husbandry sections where wage rates are set by occupations -- milkmaid, swineherd, calf tender, and others, -- the occupation of operator (machine-milking, feed-kitchen, and so forth) has been introduced at the complexes.

Independent wage schedules have been introduced for animal husbandry specialists on the sovkhozes and for workers at animal husbandry complexes. Both rate schedules provide for daily wage rates for a seven-hour work day for six categories, but the rates are higher for the complexes.

Payment systems. Payment for the workers of animal husbandry complexes is organized on the basis of a time-plus-bonus system with the use of special wage rates and a wage schedule for jobs which has been especially worked out for the complexes. At the animal husbandry complexes, as on the sovkhozes, a personal wage schedule for workers by categories is not yet being used.

A number of payment systems are used on the sovkhozes. In the animal husbandry branches where the output, for example, milk, meat (weight additions) and eggs is received during the course of the entire year the piece-plus-bonus system based on monthly results is used. At those places where the output is received at periods or once a year (in sheep breeding, fur farming, the raising of young livestock and poultry) a job-plus-bonus system is instituted. Here, before payment is made for output, wages are paid twice a month for the amount of work performed on the basis of piece rates or for the amount of time worked on the basis of wage rates. In the Standard Regulation these payments are called an "advance" (the general labor legislation does not provide for such advances). The total amount of the wages (advance) paid is taken account of at the time of final payment for output received. Additional payments (the difference) for output are distributed among the members of a team, detachment, or link in proportion to the amount of wages earned by each worker.

In the animal husbandry of sovkhozes a principle has been introduced of payment for a quintal or unit of produced output (or for its value in monetary terms) in accordance with special ratings. These ratings are computed on the basis of two indicators: 125 percent of the wage rate and the annual production (or output) norm per worker. With this payment principle, in addition to the wage fund, a wage rate fund is also formed.

There is a special characteristic in payment for substitute workers: earnings are paid to them in a definite percentage of the amount due to the worker whom they replace (the so-called "indirect" payment system; it is not provided for by the general labor legislation).

The specifics of the local legal regulation of payment. On the basis of the Standard Regulation on every agricultural enterprise a local regulation on the payment of workers is worked out every year which is approved by the administration in agreement with the workers' committee of the trade union. But it acquires the force of a legal document only after approval by the head of a superior administrative agency (in agreement with the appropriate trade union committee).

The forms, amounts, and procedures for additional payment, bonuses, and mark-ups established for animal husbandry specialists by the Standard Regulation are concretized in the local regulations.

The output norms, the time norms, and the norms for tending livestock, poultry, fur-bearing animals, and other animals, and also the annual animal husbandry output production norms per worker are worked out (on the basis of branch and interbranch standard norms for output or tending) directly at the enterprise by the administration and are agreed upon by the trade union workers' committee; they are approved by the head of a superior administrative agency. The new Standard Regulation makes greater demands upon norm setting for labor and fosters an increase in the proportion of technically substantiated output or tending norms.

Bonuses and additional payment for basic work results. On sovkhozes bonuses for animal husbandry specialists are paid on the basis of two indicators. First, for an overfulfillment of the gross output plan with regard to its quality (an increased fat content in milk, an improvement of the condition of meat, and so forth); the concrete amounts of the bonuses are fixed in the local regulations. Secondly, for a decrease in direct expenditures per unit of output, or for a decrease in its cost compared to the plan; the amounts of the bonuses are established in the Standard Regulation -- 40 percent of the economy obtained, and [illegible] the sovkhozes of the system of the USSR Poultry Industry -- 50 percent. Additional payments for an increase in the production of output on the sovkhozes are established, basically, for exceeding the average level of production which was reached during the previous two to three years.

Special payments are not made to the workers of animal husbandry complexes; that is, differential payments for output after it is received, as is done on the sovkhozes. In addition to the wages which are paid to them in accordance with the time-plus-bonus system, they receive additional payment for the fulfillment of normed assignments for the production of animal husbandry output (or of assignments for transferring animals to other livestock groups). When a normed assignment is fulfilled by 100 percent the worker is given an additional 30 percent of his wage rate, and when it is not fulfilled the payments are made in lower amounts. Bonuses for workers at complexes are established for different indicators than on the sovkhozes. Namely: for every percentage point of increase in labor productivity compared to the level stipulated by the normed assignment -- .8 percent of the wages paid according to the wage rates during the payment period; for maintaining tended livestock within the limits of the established deviation norms or for reducing these norms -- 20 percent of the wages paid according to the wage rates during the payment period.

The bonuses and the additional payments are paid from the wage fund of the sovkhoz or animal husbandry complex in the amount of not more than 5, and at enterprises of the virgin lands areas, not more than 6 monthly earnings per year per worker.

Material rewards are also provided for the animal husbandry specialists of sovkhozes and complexes for individual types of animal husbandry products, for example, for leather and sheepskins, deer horns, and for feathers, down, bristles, horse hair, and for moulting wool. The indicators for these rewards, their amounts, and payment procedures are stipulated in the Standard Regulation. Workers employed in dairy animal husbandry are paid bonuses for milk of improved quality according to a special procedure.

The animal husbandry specialists of agricultural enterprises, like other workers, are paid bonuses from the material incentives fund of the given farm which is created on the basis of allotments from profits.

Animal husbandry specialists may also be rewarded in kind, that is, with animal husbandry products (in-kind payment, the sale of goods on privileged terms, and so forth). As a rule, the forms of the in-kind rewards are established by local government agencies.

Material incentives for animal husbandry specialists for an increase in labor productivity. The directors of sovkhozes are given the right to establish, in agreement with trade union workers' committees, additional payments for workers, for occupational doubling up, for expanding service zones, and for increasing the amount of work performed. The pay addition is made in the amount of 30 percent of the rate for the basic work. The source of the pay additions is an economy of the wage fund which is obtained from reducing the number of workers compared with interbranch or branch norms.

A special type of incentives for production innovators. Milk maids, swineherds, shepherds, poultry tenders, and other workers who employ new forms of the organization of labor as a result of which they achieve an increase in labor productivity and increase the number of animals tended by them have their payment rates increased by 5 percent for every 10 percent that they exceed the norm (but no more than 2 times).

Stimulation of an increase in qualifitications. Workers in the leading occupations who are employed in animal husbandry work in agriculture are awarded the titles "Master of Animal Husbandry First Class" and "Master of Animal Husbandry Second Class." Workers who have these titles are given additional payments to their wages which are paid for output and for tending livestock and poultry in the amount: Master of Animal Husbandry First Class -- 20 percent, and Master of Animal Husbandry Second Class -- 10 percent.

Privileges for animal husbandry specialists employed in work with hard and harmful conditions. Payment for workers employed tending livestock at certain remote pastures is made according to a wage rate increased by 40 percent. The labor of animal husbandry specialist employed in caring for livestock with Bang's disease and livestock with hoof-and-mouth disease is paid for at a wage rate increased by 15 percent.

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## TRANSPORTATION

# AUTOMATED CONTROL SYSTEMS FOR AIRCRAFT REPAIR PLANTS

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 10, 1979 pp 24-25

/Article by Ye. Kitov, chief of the Aviaremont All-Union Association: "A Computer Controls Production"/

/Excerpt/ The introduction of automated control systems at aircraft repair enterprises began in 1968, when the systems of control of basic production (ASUOP's) for the repair of the Tu-104, Tu-114 and An-24 aircraft, which were developed jointly by specialists of the Riga Computer Center and the Kiev Institute of Automation, were put into operation at plants No 400 and No 410. The ASUOP made it possible to ensure efficient production control--by means of the extensive use of economic-mathematical methods, which are based on the use of computer hardware (the Minsk-22 computer), means of the gathering, fixing, transmission and storage of information. The system solved the problems of monthly planning, day-to-day management and traffic control.

Other enterprises have followed the example of these collectives, and at present automated control systems have already been introduced at 10 plants of civil aviation.

The creation of a comprehensive automated system of planning and the control of production operations of enterprises, which consists of subsystems which control various aspects of the production process (basic production, quality, technical and economic planning and so on), is now recognized as the main direction of the efficient use of computer hardware in aircraft repair. Therefore, the original system has undergone change: it has become a subsystem. The Minsk-22 computer has been replaced by more modern Minsk-32 computers, and today by means of the subsystem of the ASUOP network models of the repair of aircraft are being formed, the monthly and day-to-day scheduling of the production process is being carried out, the fulfillment of the planning assignments is taken into account and monitored and the progress of production is regulated.

In addition to the ASUOP, other automated subsystems, which increase the level of control and production efficiency, have been assimilated. Thus, the subsystem of control of material and technical supply (ASUMS), which makes it possible to plan the demand for materials, parts and spare parts for the planning year, to control the movement of physical assets and to keep an account of them, to calculate and monitor the economic indicators and to gather statistics on the movement of technical stores in warehouses, is operating successfully.

The subsystem of the control of modifications of aircraft (ASUDAT) has become a great help in work. It simplified the registration of an enormous number of bulletins of modifications, which are used by our plants, and increases flight safety.

The introduction of the subsystem of the accounting of working time (ASURV), which automatically monitors the arrival of workers on the grounds of the plant and their departure from it and registers the losses of working time due to late arrivals at and the early finishing of work and absences from work, has appreciably tightened up labor discipline.

The subsystem of the monitoring of performance (ASKI), which is in operation at a number of plants and ensures the automated motinoring of the dates of execution of reference documents, the issuing of control assignment forms to the performers, the tallying of the results of assiduity and the material stimulation of the responsible performers, is increasing the quality of management. It is characteristic that the workers of the enterprises, which have introduced this subsystem, are clearly distinguished by their assiduity.

It is well known how difficult it is to solve the question of meeting the demand of operational enterprises for the repair of units. The subsystem of the control of the repair of peripheral items (ASURPI), which is in operation at some plants, forms a list of group components, keeps account of the movement of units, solves various problems of interrelations with clients and so on, is alleviating this problem.

The subsystem of the recording of labor and wages (ASUTIZ) ensures the organization of the data on each worker, as well as the weekly processing of job authorizations, the distribution of wages and the labor-intensiveness, the analysis of the fulfillment of the norms, the calculation of wages and the compilation of payment documents and the compilation of accounting summaries on labor and wages in the shops and divisions.

The organization of socialist competition improved considerably after putting the ASU-sorevnovaniye into operation. This subsystem helps to tally the results of the competition between individual workers, brigades, sections and shops.

The very important, but hard to design automated subsystem of the control of the quality of repair (ASUKR) is at the stage of development. It should ensure the planning and monitoring of quality, the analysis and objective evaluation of the work of the performers and the product, as well as the improvement of technical training, moral and material stimulation and educational measures on ensuring the high quality and reliability of operation of aircraft after being repaired.

Computer operator T. A. Pyshnaya and programming engineer A. A. Vakhovskiy are mastering excellently the complicated computer hardware of plant No 400. Photograph by V. Grebnev.

The introduction at enterprises of the sector of all these systems is yielding a total annual saving of more than 2 million rubles and is making it possible to increase the quality of repair, to tighten up labor discipline and to achieve more effective production control. The work on further improving the existing subsystems and the development of new subsystems will be continued.

Such is one of the directions of the use of computers, a kind of base for their more extensive application. The second direction, which can be called the general direction for our plants, is the assignment to computers of the control directly of technological processes. Some experience, which, no doubt, is of interest, has already been gained here. For example, a unit for the thorough monitoring of complex systems is being introduced at plant No 400. Under the conditions of the sectional flow-line method of production this makes it possible to organize the control of the technological process of repair with the use of computers, having increased the quality and reliability of the operation of aircraft systems, improved the organization of labor and sharply reduced the repair time.

Operators of the section for the prepartion of information for computer evaluation of plant No 402. Photograph by V. Grebnev.

The collective of plant No 402 has development a method of solving on computer the problems of the optimum distribution according to static moments of the blades on the disks of the rotors of gas turbine engines. The results of the testing of D-30 engines for the purpose of improving its performance are also processed here on computer. It is significant that the time of such processing is about a minute. Previously the recording of the parameters and the construction of the throttle curve required about 1.5 hours. A program for evaluating the efficiency of the assemblies is used for determining the influence of the components of the D-30 engine on its parameters. The identification of the assemblies with a low efficiency makes it possible to modify them during the overhauling of the engine.

A flight data processing system with the interpretation of the parameters on a Minsk-32 computer and an M-6000 modular system of computer hardware is successfully operating at several plants. This makes it possible to objectively evaluate the working capacity of the systems of an aircraft according to the main parameters and to monitor the quality of its flying by the crew.

Operator O. A. Tambalayeva and engineer N. V. Timofeyev process a routine recording of the flight data control system after a test flight at plant No 400. Photograph by V. Grebnev.

The use at plant 407 of an information-logic measuring unit when testing airborne control systems is of great interest. The unit not only evaluates their operation under different flight conditions, but also increases their reliability. All this makes it possible to get by with one (instead of two) test flight after the repair of the Tu-134 aircraft.

The steps taken in this direction are only the beginning. In the immediate future computers should help in controlling technological processes not only at the final stage of repair, but also at all its preliminary stages. In other words, the development of an automated control system of the technological process (ASUTP) is on the agenda. It is possible to single out several main directions in the forthcoming work.

First of all the development of methods of the automated control of the initial technological processes, such as electroplating, soldering, welding and so forth, is necessary. Incidentally, some experience has been gained in the development of an automated control system of electroplating processes in various sectors of industry. Such systems, which operate in the mode of automatic control and regulation, already exist at a number of plants.

Automated subsystems for diagnosing the condition of aircraft will play an important role. In general attention is being devoted to the problems of diagnostics in various sectors of industry, especially in the production of motor vehicles and agricultural machinery. Automated diagnosis is of particular importance for aircraft repair: it will become as if a bridge for the transition from regulated repair to repair according to the condition. Special problems in this direction are already being solved at our plants.

A subsystem of bench tests of units is also necessary. It belongs to the category of especially complicated subsystems and is characterized by higher demands on the metrological and reliability characteristics and by the need to ensure operations of different natures on several stands. Here the number of control parameters approaches 100. Such systems can be classified as information and decision systems, that is, as systems which require the presence of a human operator.

Automated sections for the testing of fuel control and hydraulic equipment will be less complicated. Such sections will make it possible to increase the quality and reliability of the units being discharged from repair and to reduce the labor-intensiveness of repair. In the future the functions of the system can be extended to diagnostic analysis and automatic adjustment.

Computers will gradually "conquer" more and more technological processes. The persistent work of engineers and technicians, the creative aptitude of rationalizers and the assistance of experienced designers in the end will make it possible to achieve a situation, in which all the technology of repair will be set forth in "computer" language. This will lead to the creation of a sectorial "data bank." This way alone gives a guarantee of the increase of the quality of repair and the reliability of aircraft, the shortening of the repair time and the transition to repair according to the technical condition.

Annually on the whole up to 500,000 different technological documents are drawn up at each aircraft repair plant. Troubleshooters, when determining the condition of parts, assemblies and systems, fill out the primary documents (the flow sheets of flaw detection and repair). They establish the values of the parameters, describe the condition of the equipment and determine the method and type of repair and the flow route of movement--according to the technical requirements, the blueprints and the operation technology. Then this series is supplemented by secondary technological, organizational and economic documents (the demands for the receipt of parts, materials, lists of standard equipment, authorizations for the performance of jobs and others), which in many respects double the information.

The significance of this documentation is enormous, the quality of repair, flight safety and the technical and economic indicators of the operation of the enterprise depend on its high quality compilation. The majority of the documents are filled out by hand--more than half of the working time of specialists is spent on them! The automated subsystem of the technological preparation of production (ASUTPP) will help to rationalize their labor.

The ASUTP and the ASUTPP promise great advantages, but only when they are linked by a common standard reference base with the entire complex of automated control systems. Indeed, the high road of aircraft repair is visible only in the comprehensive utilization of all the subsystems.

It is more complicated to introduce automated control systems at an already operating enterprise than at one being newly built. Therefore, automated control systems of technological processes should be immediately installed at all the enterprises being built and renovated. Their development and introduction will be financed by means of the capital investments for construction or renovation. Unfortunately, in practice we often deviate from this rule.

It is necessary to dwell on the technical level of the computer hardware being used at aircraft repair plants. At present they are equipped with second generation computers and some sets of peripheral equipment. In order to solve the set problems of developing automated control systems it is necessary to use more modern large computers of subsequent generations in combination with minicomputers, special analog or digital analog devices and modern means of the gathering and transmission of data. The selection and use of computers should be substantiated by a technical and economic estimate. The preparation of the entire project for the effective use of computer equipment is also necessary.

The improvement and development of automated control systems also imply the improvement of mathematical methods, the intensification and expansion of the optimal planning and management of production for the purpose of achieving high technical and economic indicators of the activity of the enterprise, as the decree of the CPSU Central Committee on the further improvement of the economic mechanism requires.

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## TRANSPORTATION

### PREPARATION OF MOSCOW AIRPORTS FOR OLYMPICS

Frunze SOVETSKAYA KIRGIZIYA in Russian 27 Sep 79 p 4

/Interview with USSR Deputy Minister of Civil Aviation S. S. Pavlov by Ruslan Bazurin (NOVOSTI PRESS AGENCY): "The Airports of the Capital Are Being Readied"/

/Text/ /Answer/ In the summer of 1980 Aeroflot, the main air carrier of the participants and guests of the Olympics, has to bring to Moscow every day 60,000 passengers more than usual," USSR Deputy Minister of Civil Aviation S. S. Pavlov said to the NOVOSTI PRESS AGENCY correspondent. "And in all about 1 million participants and guests of this largest sports festival will make the trip by air to our country and back again.

"Today Moscow is the most important junction of the air routes which link more than 200 cities of the country. From the international airport of the capital--Sheremet'yevo--planes make regular flights to 97 cities in 78 states of the world. But in connection with the proposed increase of the flow of passengers during the Olympics all four Moscow airports will be renovated.

"At present the Vnukovo, Domodedovo and Bykovo airports in Moscow serve the intra-union routes. The first two are the main ones. In a day 600 regularly scheduled planes arrive here and depart from here. By the 1980 Olympics Vnukovo will be augmented by a new two-story building, in which waiting, passenger departure and arrival rooms, a restaurant, a cafe and refreshment counters will be located. After renovation the airport will be able to handle up to 12 million passengers a year.

"Domodedovo airport will become the main airport for handling heavy types of planes. Here the runways are now being renovated, and the aircraft landing and traffic control equipment is being modernized.

"Let us note in passing that in 1980 the renovation of Vnukovo and Domodedova will not end. In the future they will be expanded even further and will join the largest airports of the world.

"In Moscow two more air terminals with hotels for passengers in transit--at the Kashirskaya and Yugo-Zapadnaya subway stations--will be added to the air terminal already in operation on Leningradskiy Prospekt, which links all four airports by bus routes.

"The Sheremet'yevo International Airport will handle the guests of the Olympics from foreign countries. Its expansion occupies a special place in the construction program of Aeroflot. Today one of the new runways, which is ready to handle the most modern aircraft, has already been built here. And by 1980 a new air terminal--the Sheremet'yevo-2, which will form a unified airport complex with the existing Sheremet'yevo-1--will rise next to the existing air terminal.

"In the eight-story building of the new airport everything will be subordinate to the main thing--the convenience of passengers. The 19 telescopic ramps, to which the airliners will be moored, will enable the tourists to board the plane directly from the waiting room or, without going out onto the airfield, to disembark into the arrival room. The procedures of recording the arrivals and the receipt of baggage, which is delivered to the arrival room on multimeter conveyer belts, will take a matter of minutes. To a considerable extent the computer installed here is conducive to this. The computer will also control the information display boards.

"By the 1980 Olympics the Aeroflot fleet of passenger airlines will be expanded. Along with the well-proven Il-62, Tu-154 and Tu-134, the new Il-86 airbus, which seats 350 passengers, will provide Olympic transportation. The Moscow airports, of course, will also handle modern foreign types of aircraft.

"In July and August of 1980," S. S. Pavlov says in conclusion, "the capital's airports will be able to handle 8,000-10,000 passengers an hour. This figure exceeds the capabilities of the airports of Munich and Montreal, which they had during the holding of the Olympic Games."

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# AVIATION WORKERS UNION MEETING DISCUSSES FLIGHT SAFETY

Moscow VOZDUSHNYY TRANSPORT in Russian 29 Nov 79 p 4

[Text] The following matters were examined at a scheduled meeting of the presidium of the central committee of the aviation workers trade union: the work experience of the council of public flight safety inspectors at the Alma-Ata aviation enterprise; the progress of implementation by collectives of enterprises of the All-Union "Aviaremont" Association of the CPSU Central Committee, USSR Council of Ministers, AUCCTU, and Komsomol Central Committee decree "On All-Union socialist competition to improve production efficiency and work quality and successful fulfillment of the targets of the 10th Five-Year Plan"; on the progress in implementing the resolutions of the trade union central committee of 26 October 1976, 23 August 1977, and 24 July 1979; and on the work of the Belorussian Republic committee of the union of aviation workers in preparing for the 1980 Olympics.

The presidium of the union central committee approved the work experience of the council of public flight safety inspectors of the Alma-Ata aviation enterprise of the Kazakh Administration of Civil Aviation in training personnel with high responsibility for implementing requirements of reference documents which regulate flight operations, for preparing aviation equipment for flight and for air traffic control, and recommended it for dissemination and introduction in the sector's enterprises.

The presidium noted that significant work had been performed by committees of the union and civil aviation plant managers in developing and improving socialist competition to raise efficiency and quality in the maintenance of aviation equipment.

At the same time, the standard of organizational work by union committees and the managers of a number of enterprises of the "Aviaremont" Association still are not meeting requirements to the full extent.

The presidium obliged the chairmen of committees and economic managers to improve the organization of socialist competition in labor collectives. It was decided to develop additional measures to mobilize the collectives of enterprises for exemplary implementation of Olympics transportation.

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TRANSPORTATION

## MEASURES TAKEN TO REDUCE FLIGHT DELAYS CITED

Moscow VOZDUSHNYY TRANSPORT in Russian 29 Nov 79 p 4

/Article by correspondent V. Shul'gin: "What Coordinating Flights Does"/

/Text/ There is little that is pleasant in a flight delay, of course. But the kind of weather can occur where not only aircraft are grounded at airfields, but motor transport drivers find it difficult on the roads as well. If departure is held up for a long time, some passengers turn in their tickets and get to their destination by another means of transportation or postpone the trip. Aircraft may depart on schedule with empty seats.

"So that this does not happen," says A. Andreyev, chief of the Central Traffic Service, "we try to coordinate flights. Let us assume that we must carry 1,000 passengers in 10 trips. But it turns out that half of them have turned in their tickets because of a weather delay. What is to be done so that aircraft are not sent out half-empty? Passengers can make two flights in one aircraft, for example. What does this provide? Coordinating flights to Khabarovsk, for example, means about 120 tons of fuel. I want to direct your attention to the following: coordinated flights are expedient primarily when there are "interruptions" in the regularity of flights because of weather conditions..."

Traffic service collectives are employing various measures in order to dispatch passengers as rapidly as possible, to reduce aircraft downtime, and to save fuel. This means using backup aircraft when necessary. This also means overflying airports where the weather is below minimums. For example, a flight should be made over the Moscow-Sverdlovsk-Novosibirsk route. But Sverdlovsk, let us assume, has been closed for 9 hours. Most of the passengers will fly to the terminal point. The decision is made to send the aircraft as far as Novosibirsk. And the Sverdlovsk passengers will leave on the first flight, as soon as the airport is open. They reduced the delay time of 556 flights by nearly 5,000 hours in this way in the third quarter of this year.

"Substituting types of aircraft for more economical ones when possible and coordinating flights," A. Andreyev continues, "have made it possible to save about 1,500 tons of fuel this year. Of course, this is a troublesome matter and requires efficiency. And many services in the complex are resolving it. In fact, it is extremely important that a worried passenger be explained in time and tactfully the reason for the delay and that he be told the actual time of departure. I would like to receive more precise and qualitative information on the number of passengers from enterprises' operations and traffic services. The decisions to coordinate flights are made primarily on the basis of their data..."

The regularity of flights today, unfortunately, still depends on the weather. True, a great deal is being done so that we do not depend on its whims. Thus, for example, training of crews for flights is being conducted under reduced weather minimums and airfields are being equipped with automatic approach facilities. And when bad weather makes itself felt all the same, conditions of maximum organization in all services and subunits are necessary.

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## TRANSPORTATION

# PROGRESS, PROBLEMS IN PUTTING IL-86 INTO SERVICE CITED

Moscow VOZDUSHNYY TRANSPORT in Russian 9 Aug 79 p 1

[Editorial: "Anticipate the Arrival of New Equipment"]

[Text] The Communist Party and the Soviet Government continuously demonstrate paternal concern for further reinforcement of the material and technical base of Aeroflot. Modern airliners such as the Il-62, Tu-134 and Tu-154 have appeared on our country's airways in recent years, becoming the basic aircraft for the main medium- and long-range routes. The fleet of aircraft on local airlines is being continuously brought up to date and improved. Modern domestic aircraft are provided with the most advanced navigation equipment, which ensures a high standard of safety and flight regularity. However, the continuing increase in the volume of passenger transportation requires new, more spacious and faster aircraft. This task was set for aircraft manufacturers and employees of Aeroflot enterprises in the Directives of the historic 25th party congress: "Begin operation of the new Il-86 (airbus) and Yak-42 passenger aircraft, the Il-76 cargo aircraft, and aircraft for local airlines and agricultural aviation. Provide for the conduct of experimental and scientific research operations to create new airplanes and helicopters with technical flight and economic characteristics which conform to long-range requirements for the development of civil aviation."

In carrying out these plans, Soviet aircraft designers and civil aviation workers have performed a great deal of work to create and develop an airliner—a fundamentally new type of wide-bodied aircraft, the Il-86 airbus.

Compared with hitherto existing aircraft, this airplane has a number of design and technical peculiarities which lead to specific complications in its operation and technical maintenance. The large passenger capacity requires new technology in the work of transport organization services. The hydraulic control of air doors and hatches dictates the necessity of improving the technical skill and precise interaction of crew members. The electronic control of air conditioning and fuel supply systems also presents many peculiarities. It seems that there is no need to dwell on all the innovations built into the Il-86. As it is, it is obvious that preparation for its acceptance and operation is an important stage in the history of Aeroflot's development.

The leadership of the Ministry of Civil Aviation and the Ministry of the Aviation Industry at one time worked out and approved the overall plan for development and testing of the Il-86. In particular, Vnukovo Airport was specified as the base airport where tests will be conducted and operation of the aircraft will be begun. The activity of organizations taking part in the manufacture and development of the airbus is being checked and coordinated at regularly held conferences.

The leadership of the Ministry of Civil Aviation conducts special study sessions every month with representatives of all services which are taking part in preparation of the Il-86 for flights. At these sessions, what has been accomplished is summed up and tasks for the future are set.

The best representatives of services and subunits have been selected for retraining. One cannot help but mention aviation technicians Zh. Goncharenko, I. Galli, and V. Khakhin and engineers V. Fedorov, V. Kapustin, V. Dvugroshev and S. Antipov.

Flight personnel such as F. Yashborovskiy, A. Babakov, V. Kalimanov, A. Kaledin and V. Senokosov have proved themselves excellently in familiarizing themselves with the Il-86.

The best flight personnel, who have wide work experience, have been selected for retraining on the Il-86 aircraft. The aircrews have had the necessary flight training and have been accepted for flights.

The Il-86 simulator, which will contribute to a significant degree to improving the quality of flight training, has been put into operation at the GosNII GA /State Scientific Research Institute of Civil Aviation/ base. The institute collective, together with the flight and engineering services of the Moscow Transport Administration, is resolving problems of organizing a group of specialists to prepare punched cards with navigation data on the route of flight for the airborne computer.

Organization of training for familiarization with the Il-86 has been accomplished well in the aviation engineering service. Thus the needed number of engineers and technicians have been retrained. The composition of the shop which will service the airbus has been worked out. An engineering schedule has been developed for its maintenance. An analysis has been produced and comments have been made on available documentation.

The special-purpose motor transport, fuels and lubricants, and transport organization services also are actively preparing for operations.

However, the progress should in no way make us complacent, because there is still much to do. Thus, for example, instructions on the center-of-gravity position and loading of the Il-86 aircraft and center-of-gravity position diagrams and training posters have not yet arrived. The necessary tow tractors, self-propelled loaders, and freight lifts /avtolifty/ are still not available in the Vnukovo Production Association.

Their delivery depends primarily on industrial enterprises, of course, but aviators should not remain on the sidelines in this matter; they should reinforce the necessary business contacts and take steps to speed up deliveries of everything that is needed.

In the time remaining until the first aircraft is received, Vnukovo workers must resolve the problem of accommodating engineering and technical personnel on the ramp and equip these facilities with means of communication. It is necessary to speed up the conclusion of contracts with industrial enterprises for the manufacture of jet blast shields. An important direction of the work is speeding up equipment of the fuels and lubricants laboratory.

Similar wishes should be expressed to those airports where flights of the Il-86 airbus are being planned: Alma-Ata, Novosibirsk, Tashkent, Sochi, Mineral'nyye Vody, and Rostov-na-Donu. Unfortunately, such an important matter as the preparation and maintenance of the Il-86 has not been approached everywhere with the proper responsibility. This matter is being handled particularly poorly at the Tashkent airport.

Major tasks are facing the ground services in connection with introduction of the airbus, and the transport organization service deserves to be put in the first row. It is necessary right now to develop and define more exactly the technology for passenger services on the Il-86 aircraft and to master the processes of transporting freight and baggage.

Introduction of wide-bodied aircraft on the air routes is a qualitatively new stage in passenger service. It makes it possible to significantly increase the development of passenger transport and to raise the standard of services to a qualitatively higher level. All those who are involved in preparing the Il-86 aircraft and putting it into operation should understand this very well. And of course, communists should demonstrate an example in this most important matter. The duty of party organizations of all subunits is to put competent, energetic communists who are full of initiative in all the critical areas and to keep track of discipline and strict fulfillment of the responsibilities assigned.

At a recent enlarged session of the collegium of the Ministry of Civil Aviation, Chief Mar Avn B. P. Bugayev, minister of civil aviation, said: "The mission set by the 25th CPSU Congress to fully meet the requirements of air transportation should be carried out with high efficiency and quality--in a word, in an exemplary manner. This is the essence of the 'Aeroflot should become the standard in transport' movement. Successful mastery of the Il-86 is one of the stages in putting this patriotic initiative into practice."

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## TRANSPORTATION

### L'VOV RAILROAD SYSTEM VIEWED AS A LINK WITH CEMA COUNTRIES

Kiev RABOCHAYA GAZETA in Russian 18 Nov 79 p 3

[Interview with Grigoriy Porokh, chief of the L'vov RR: "Main Highway of Friendship"]

> The L'vov RR runs in the area of the western frontier of the Soviet Union. There are 13 railroad transfer points linking it with the main lines of Hungary, Poland, Czechoslovakia and Romania. During the past two decades, the volume of foreign trade shipments among the CEMA member countries along the L'vov's main highway of steel has quadrupled.
>
> Grigoriy Porokh, chief of the L'vov RR, tells about the collaboration of the Soviet railway workers with the railway workers from fraternal socialist countries.

[Text] "Recently Mikhail Gliva, a veteran of our railroad, was awarded the title of honored railway worker of the Czechoslovak Socialist Republic. During the difficult postwar years he ran the first Soviet consist carrying grain for Czechoslovakia. Completing such a run then was not at all that simple. The German occupation forces had left cities, yards and railroads in ruins in their wake. More than 1,000 km of main-line and yard tracks were destroyed and 682 bridges, 10 tunnels, 26 overpasses and other structures had been blown up. The damage inflicted by the fascists on railroads of the western Ukraine exceeded 1.2 billion rubles. But, all the same, the first train arrived in L'vov ten days after the liberation of the city."

"Since that time, the L'vov RR has become an important link in the electrified trans-European main highway running Moscow-Prague-Budapest. Trains also go through L'vov to Warsaw. The consists are pulled by modern electric and diesel locomotives of Soviet and Czechoslovak manufacture. Border railway junctions, transshipment stations and points for rearranging consists are continually being improved and modernized. New container terminals are going into operation. The problem of transporting along a gage of different width is being solved with the help of highly-efficient means for the mechanization of loading operations and of containerized and packet shipments. The delivery of foreign trade shipments without reloading is achieved by the construction of tracks of the same width. A line with a width of 1,520 millimeters joining the Soviet station of Uzhgorod-2 with the Czechoslovak city of Košice can serve as an example. This line enables one to deliver ore from Krivoy Rog to the Košice Metallurgical Combine without reloading at the border station. A similar line will link the city of Vladimir-Volynskiy with the "Katowice" Metallurgical Combine in Poland by 1980."

"The growing volumes of shipments," Grigoriy Porokh continues his account, "will confront the collectives of the border railroads with new tasks. We are discussing ways to heighten the efficiency of operations in conjunction with our colleagues from the fraternal socialist countries, such as Jan Zagorsky, chief of the Eastern RR of the CSSR, József [Kul'char], manager of the Debrecen RR of the Hungarian People's Republic, and the chiefs of other border stations. Without continuous fraternal mutual assistance, it is simply impossible to imagine the successful operation of border railroads. For instance, in order to speed up the movement of freight running to Hungary, Czechoslovakia and Poland, the Soviet side is re-mounting a substantial portion of tank cars containing chemicals onto a gage of 1,435 mm, while at the same time, the loading of railroad cars for dispatch to the Soviet Union is being carried out at the yards in Záhony (Hungarian People's Republic) and Cierna (CSSR)."

"Here are some other examples of the collaboration of the railway workers from the fraternal countries. Last year when the need arose to repair the track from the border of the USSR to the Košice yards, our railway workers came to the aid of our Czechoslovak colleagues. There were 20 flatcars for hauling rails, as well as a special consist for the delivery of ballast and a tie-tamping machine that were earmarked to be put at the disposal of our neighbors."

"Ivan Genyuta and Mikhail Tovaryanskiy, mechanics from the Uzhgorod Branch of the L'vov RR, particularly distinguished themselves during the repair of the railroad."

"The joint campaign for efficient utilization of transport and for an acceleration of the delivery of foreign trade shipments has grown into international socialist competition. The first agreement on labor rivalry was signe signed 15 years ago between the collectives of the yards at Chop and Záhony and later on their example was followed by the railway workers of the station at Batevo (USSR) and [Eperiyeshke] (Hungarian People's Republic). Then Then the Czechoslovak and Polish railway workers joined in the socialist competition. The names of the stations at Čierna-nad-Tisoj, Vel'ké Kapušany, Medyka, Dorokhusk, Mostiska and Yagodin have appeared on the list of rivals."

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# TRANSPORTATION

## GRAIN CAR HANDLING LAX

### Delays in Grain Movement

Moscow GUDOK in Russian 6 Oct 79 p 1

[Article by G. Isakov, GUDOK correspondent, Alma-Ata: "Grain Cars Pinned Down"]

[Text] The Ministry of Railways allocated 150 grain cars to the stations of Kazakhstan for shipment of the new grain harvest.

But here the first grain train has arrived in Alma-Ata from Turgayskaya Oblast ... and has been held up here nearly 4 days. Five cars left the rails at the milling combine here because of the unsatisfactory condition of the track. The second train has arrived in Chimkent. At the milling combine here they unloaded the first group of cars in 12 hours, and exactly the same number of grain cars stood waiting for cleaning.

One could cite quite a few such examples. Loaded grain cars stand for hours at the station Chu, and in the section Mointy--Sary-Shagan they move at half the scheduled rate. Though they have been shown in color on the schedules, it seems they have received no further special attention.

Possibly the reason for this attitude toward the use of grain cars is that they reach the Alma-Ata line loaded, they all go back empty, and are consequently "unprofitable" for this line. Meanwhile the Alma-Ata line is itself 1,800 cars behind in loading grain. Since the Alma-Ata people are experiencing difficulties obtaining empty cars, it is therefore surprising that they are so indifferent to the specialized rolling stock which is scarce.

### Railroad Reacts to Article

Moscow GUDOK in Russian 23 Nov 79 p 2

[Unsigned article: "Use of Grain Cars Under Scrutiny"]

[Text] An article entitled "Grain Cars Pinned Down" was published in GUDOK on 6 October. A thorough analysis of the use of grain cars has been conducted in the traffic department of the Alma-Ata line. It showed that the delays in unloading them are caused as a rule by consignees. The Kazakh People's Control Committee and the republic procurements ministry have been so notified, and a representation has also been made to Comrade Grebenyuk, deputy chairman of the Kazakh Council of Ministers. Comrade Nurbayev, Burul stationmaster, received a reprimand for poor organization of the unloading of grain cars and delays in dispatching them. The following stationmasters were put on strict notice: Comrade Shigapov of the Karaganda switchyard, Comrade Akhmedova of Sary-Shagan and Comrade Ivasenko of Chu.

A special group to monitor the movement of grain trains has been set up in the line's headquarters. Every delay of grain cars now becomes a subject of thorough analysis by the management of the line and by the organizations involved. Comrade Buranbayev, chief of the Alma-Ata line, reported this to the editors.

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## TRANSPORTATION

### TRAFFIC REPORT ON SIBERIAN, FAR EAST RR'S

Moscow GUDOK in Russian 29 Nov 79 p 4

[Unsigned article: "Who Is Putting a Spoke in the Wheels?"]

[Text] Movement of trains on the lines of Siberia and the Far East has improved markedly since the beginning of November. They have moved faster in the eastward direction. This can be judged from their arrival at Arkhara junction. By comparison with the first days of November it has considerably increased train flow from west to east.

Their run in the westward direction has speeded up noticeably. The surplus of equipment in service needing to be transferred to the west has decreased some 30,000 cars.

We should note a remarkable fact: the rate of flow of trains carrying fuel in the odd-numbered direction has increased. The reason is that the collectives of the Far East, Krasnoyarsk, Sverdlovsk and South Ural stations have begun to ship more coal. Coal-loading rates have increased somewhat at Kemerevo station: about 100,000 tons of fuel have been shipped here in the last 6 days.

In short, Operation East-West is proceeding successfully at present. What is disturbing is something else. In the recent past Kuybyshev and Gor'kiy have begun to hold up east-west trains destined for the junctions of Kropachevo and Balezino, respectively. The result is that some 40 neglected trains have accumulated at the South Ural station. The drop in trains received at Kropachevo was particularly sharp in the last 10 days of November. The reason is that the Bashkir division has increased its loading of petroleum products and the Dema switchyard is unable to process the flow of cars sent to it. Traffic controllers of the South Ural station obviously have good reason in this situation to route some of the trains through Kinel'--bypassing Dema.

A problematical situation has also come about at Druzhinino junction. According to the plan it is supposed to have 55 east-west trains per day, but it is receiving only 38.

So, traffic department personnel must now solve the problems of the junctions at Balezino, Kropachevo and Druzhinino as quickly as possible.

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# MAIN TRENDS IN FURTHER DEVELOPMENT OF ASUZHT

Moscow ZHELEZNODOROZHNYY TRANSPORT in Russian No 6, 1979 pp 52-56

[Article by Yu. S. Khandkarov, chief of the Main Administration of Computer Technology of the Ministry of Railways]

[Text] According to order No. 30 Ts and the complex program for development and improvement of the efficiency of ASUZhT [Automated Control System for Railroad Transportation] during 1978-1985, priority introduction of automated systems is planned on the railroads and in the MPS [Ministry of Railways], which will ensure improvement of control over the transport process, improvement of passenger service, an increase of hardware reliability, an increase of labor productivity due to automation of mass information processing at enterprises and at organizations of railroad transport and automation of production processes. For this purpose the Main Administration of Computer Technology of MPS, jointly with a number of other central boards, scientific research and planning organizations, is developing and solving a complex of specific production problems.

The main trends for improving the control of the transport process by using computer technology is automation of calculations and analysis of fulfilling the planned tasks and norms which regulate the transport process, development of automated information retrieval systems for operational control of the transport process and ASU for mutually corresponding marshalling yards of the most important railroad lines.

The first group of problems includes calculations of the annual and monthly plans of freight shipments, technical norms of operational work, traction calculations and working out traffic schedules and the schedule of forming trains and the monthly routing plan.

Development of monthly shipment plans is being conducted on all railroads of the system. Inefficient shipments (not corresponding to the diagrams of normal freight traffic flows and also short-run, opposite and excessively long runs) are determined by using computers. Thus, in 1978 the computer centers (VTs) of the railroads revealed more than 36 million tons of inefficient shipments in the monthly plans, which permitted the freight services to eliminate more than 19 million tons of freight from the transport plans after additional analysis.

Conversion to solution of this problem by using third-generation computers is now under way. Joint calculations of the monthly freight shipment plan and the technical norms of operational work are provided. Data accumulated in the computer memory on the scope of loading and unloading, determined upon calculation of the monthly shipment plan (railroad shipments and summary plan throughout the system) will be used to automate compilation of the technical norms of operational work.

Monitoring and analysis of fulfilling the loading plans on the railroads will be accomplished from data of machine processing of waybills and their stubs. The information contained in these primary accounting documents can be used for all types of analysis of freight operation and the transport process. Processing this information on computers permits comparison with the plans and to analyze loading by stations, sections and railroads, by the roads of destination, the type of freight, the types of rolling stock, the days of the week and month and the weight of car by car shipments, to analyze unloading and to monitor the generation of empty car flows, to calculate the car and freight traffic flows between railroad terminal stations, railroad sections, economic regions and railroads (according to the type of freight and type of rolling stock), to compile all statistical reports on loading and shipment of freight and to distribute the income from them among the railroads and to calculate the deadlines for delivery of freight and the travel time along each mainline railroad. This incomplete list of the materials for machine analysis shows what broad possibilities for improving the management of freight operation are opened up with a complex, systems approach to the problem of automation of shipment planning.

A working group of representatives of the technological planning-design office (PKTB) of the Main Administration of Computer Technology (TsUVT) and the VTs of the October, Kuybyshev, Moscow, Belorussian and Northern railroads, which has been entrusted with generalizing the experience accumulated on the railroads and of working out an integrated system for processing waybills and their stubs in 1979-1980, has been created to implement these opportunities.

It should be noted at the same time that, despite specific successes, there is a significant gap in the operations carried out in this field--annual planning of shipments has fallen from the field of vision of scientific organizations and computer center employees. In this regard, a method of machine planning and a complex of programs for calculating the annual shipment schedule should be developed in the near future.

The monthly technical norms of operational work are calculated by means of computers on the Moscow, Donetsk and Northern Caucasus railroads. The complex of these problems is being solved in the experimental operation mode on the Southern Urals and Eastern Siberian railroads and preparatory work is being carried out to organize these calculations on the Belorussian, October, Southeastern, Southern and Central Asian railroads. The norms of passage of loaded and empty cars through the terminal stations of the railroads are calculated monthly at the Main Computer Center (GVTs) of MPS.

However, it should be noted that, despite the adopted measures, introduction of this task is slow in being accomplished on a number of railroads. The method and typical machine programs worked out by the Belorussian Institute of Railroad Transport Engineers and the VTs of the Donetsk Railroad have a number of significant deficiencies which were revealed only upon operation of them. The developers did not take into account the specifics of this task and did not provide the opportunity to accomplish the mode of "man-machine" dialogue, which permits variation of the preliminary data and intermediate results during calculations and makes it possible to carry out reverse calculation (i.e., calculations in which the final results or part of them are entered into the machine as given to determine the variation of the input data).

At the same time, the opinion of the workers of the traffic services of a number of railroads, who feel that the given task cannot be utilized without elimination of these deficiencies, cannot be recognized as justified. Even without revising the algorithms and programs, machine calculations permit automation of a significant part of the routine recordkeeping of technical norms and there is the opportunity to carry out almost all the calculations by using computers with purposeful selection of the input data and normative-reference information. Organization of these calculations on the railroads will reveal other deficiencies of the method and algorithms of calculation, which will make it possible to avoid them in revising the task on the YeS EVM. The All-Union Scientific Research Institute of Railroad Transport (VNIIZhT) is being recruited to carry out these operations.

Traction calculations by means of computers are now being carried out on all the railroads. The workers of the traffic services, locomotive, electrification, signalling and communications services and planning organizations calculate the required amount of versions of strengthening devices on sidings and at stations and on sections. The problem of automation of traction calculations has been completely resolved. In the future it will be necessary only to revise the machine programs on the YeS EVM with regard to the experience accumulated on the railroads.

The Computer Center of the Southwestern Railroad, jointly with VNIIZhT, has been making computer calculations of two-way train traffic schedules for specific sections since 1976. The capacity was increased by 2-4 percent due to improving the laying of train traffic lines using computers for sections with total length of 7,000 kilometers and the section speed increased by 1-1.5 km/hr in this case. The algorithms and programs for two- and one-track lines are now being revised on the YeS EVM, which will be completed this year.

Programs for control of schedule compilation have been worked out and checked at VNIIZhT for automation of scheduling, which carry out machine calculations of schedules on standard forms. A special sector has been created at the Main Computer Center of MPS to carry out mass calculations of schedules.

The network plan of formation is calculated at the GVTs annually by means of computers. The machine plan permits maximum reduction of the amount of car handling at the marshalling yards of the system. However, the disadvantage of this plan is the necessity of revising a large amount of data at the mechanized accounting plants (FMS) for calculating the standards for distribution of transient freight traffic flows among the marshalling yards of the railroads. It is impossible to carry out this work each year due to the high load of the FMS. Therefore, the standards are rapidly becoming obsolescent.

In this regard, MIIT [Moscow Institute of Railroad Transportation Engineers] is now working out new programs for YeS EVM, which will be completed in 1979. The new programs take into account the accumulated experience of solving this problem and also the possibility of annual correction of rail car flows, calculation of which will be provided by automation of processing waybills on all railroads. Moreover, the high productivity of the YeS EVM will permit a significant increase in the number of marshalling yards included in the calculation and will thus increase the quality of the train forming schedule.

This year the VTs of the Southern Railroad and VNIIZhT will complete work on automation of calculation of the intraroad forming-up schedule, which it is planned to use at the computer centers of other railroads after extensive checking.

A complex of programs for calculation of the monthly dispatch routing schedules, which made it possible to increase freight shipment in block trains by 5-7 percent, was developed and introduced on the Moscow and Pre-Baltic Railroads according to the MIIT method. This problem is also being solved on the Donetsk and Sverdlovsk Railroads and preparation for introduction of it on ten additional railroads is under way. It is planned to automate the calculations of the monthly dispatch routing schedules on all the mainlines of the system before the end of the five-year plan.

A more improved method of preparing normative-reference information is being developed with regard to the accumulated experience of machine calculations of dispatch routing schedules at MIIT and a complex of programs for the YeS EVM is being compiled jointly with the VTs of the Moscow Railroad.

Machine calculations of the locomotive brigade operational schedules, developed by the Dnepropetrovsk Institute of Railroad Transport Engineers, introduction of which made it possible to achieve a large saving, have become widely distributed at the railroad VTs.

All the considered groups of problems comprise the basis of a subsystem for automation of planning and normalization of the transport process. Conversion of their solution to the YeS EVM with regard to the operating experience of second-generation computers will increase the quality of calculations and will prepare an information base for optimization of monthly and annual planning and rate fixing of the transport process.

Control over the transport process is also being improved by development of automated information retrieval systems for solving operational control problems. This group of problems includes automation of operational accounting and forecasting of the location and status of rail cars, trains, locomotives and locomotive brigades and also freight loading and unloading.

Based on machine processing of data obtained from the results of keeping records of these objects and events recorded directly from primary documents (full-scale lists of trains, waybills and their stubs, rail car lists and block trains of engineers), data on forecasting the approach of trains, rail cars, freight and locomotives will be issued to the users by computers, calculations of daily shift operating schedules of the sections and railroad, current operating plans of the marshalling yards, tasks to regulate the empty car fleet and distribution of locomotives and locomotive brigades will be made, train operation, loading and unloading, the use of rolling stock will be analyzed and so on.

The primary information retrieval system of this type has been created and developed on the Belorussian Railroad. The most valuable in this system is the fact that an automated system for keeping a record of the distribution and status of trains and rail cars, based on real-time machine processing of data of full-scale lists of trains and on one section of the railroad (Vitebsk), also based on automated recordkeeping of loading based on gathering and processing of data taken directly from waybill stubs, has been created for the first time on the test area of the entire railroad. Future work in this direction will also be carried out on the Gor'ky and October Railroads. This will open up broad opportunities to improve the operational control of the transport process, to improve the use of rolling stock and to provide the users with reliable information on the approach of freight.

The ASU of the Belorussian, Gor'ky and October Railroads, supplemented by automation of recordkeeping of locomotive use and of locomotive brigades and by the corresponding information-technical base, are the future typical ASU of the railroad. These systems are being developed on the Moscow, Northern, Southern Urals, L'vov, Pre-Baltic, Southwestern, Transbaykal and Far Eastern Railroads. These ASU will subsequently be introduced on all the railroads as the technical base is developed.

Construction of a number of objects for management of computer technology, including the building of the Main Computer Center of MPS, the technical buildings of the VTs on six railroads, the building for the automated seat reservation and ticket sales system at Moscow is now under way and work is also being carried out to develop a data transmission system on three railroads to develop the material-technical base of the ASU for railroads, which completely ensures realization of the capabilities of the ASUZhT. It is planned to increase capital investments for these purposes in the future.

Information retrieval systems which process the data presented by the statistical record- and bookkeeping departments of the railroad sections have now been created on the railroads, which permits annual formation of various reference tables which characterize the freight and train operation of the railroad subdivisions for the railroad managers. These input data are sent to the GVTs of MPS for the Diskor information retrieval system, whose users are the directors of the ministry and a number of main administrations.

An important element in improving management of the transport process is introduction of ASU for marshalling yards, designed to reduce the time the rail cars are at the stations by automation of processing transport documents and data on rail cars and of improving the planning of train separation and marshalling. These ASU also inform the marshalling yards along the route of the compositions of trains dispatched to them and provide information and technical interaction with the railroad computer center and the dispatcher apparatus of the division.

The ASU of the first unit have now been introduced at eight stations. The production process of train separation and marshalling was improved, intrastation communications were intensified and the work of technical offices was revised during development of the automated systems at the stations. Compiling a dynamic model of the marshalling fleet, automated compilation of lists on the points of separation of flexible hoses, marshalling lists and full-scale lists of trains, accumulated waybills, lists for supplementing the engineer's block train and so on are being organized at this stage by using computers. The necessary reference data on the presence and status of rail cars and trains are issued on a display screen to the station managers and marshalling dispatchers. Automation of recordkeeping of rail car idle time, compilation of operational and statistical bookkeeping on the operation of the station, current work scheduling and also scheduling of rail car repair without separation is provided during development of the ASU.

ASU will subsequently be developed at the main marshalling yards of the Moscow-Urals-Siberia-Far East, Chelyabinsk-Kinel'-Penza and Moscow-Khar'kov-Donbass-Baku lines. Introduction of ASU interacting with the railroad VTs and with each other on entire lines and test areas will provide high quality and timely transmission of train information, will improve the conditions for locomotive regulation and will permit a reduction of unproductive rail car idle times in the station fleets and trains awaiting dispatch.

The ASU of marshalling yards should also perform the role of reference information points and organizational links in the ASU of railroads.

Supplying the technical offices of the stations with small computers for automation of train document processing is continuing. Marshalling lists, accumulation invoices and full-scale lists of trains are compiled at 15 marshalling yards by using small computers. Work has begun on the use of computers to control hump-yard devices and also to keep a record and plan the exchange of rail cars with foreign railroads at border transloading terminals.

The enumerated complexes of problems comprise the main content of the work of collectives of the computer centers during 1979-1985 in the field of improving control over the transport process. More than half of the labor resources and machine time will be allocated to implement them. The success of development and introduction of these problems depends to a significant degree on the attention and assistance on the part of the users of the system--the employees of the traffic and freight services. Therefore, it is extremely necessary that the railroad managers, the managers and specialists of the main boards and of the traffic and freight services participate actively in the work to develop the ASU for the transport process.

One of the most important national economic tasks in the field of using computers in railroad transport is improvement of passenger service primarily by improving the organization of ticket sales. Development of an automated seat reservation and ticket sales system for passenger trains (the "Ekspress" system), which permits the sale of more than 180,000 tickets per day, has been completed at Moscow. Provided there is uniform arrival of orders for service, this system makes it possible to completely meet the needs of the population. However, the applications of passengers for tickets come in irregularly in practice, due to which the system does not provide timely processing of all orders during the peak hours. In this regard investigations are now being carried out by VNIIZhT, PKTB of TsUVT and the "Ekspress" VTs on development of a new system whose productivity will be 3-4 times higher than the existing system. It is planned to introduce the new system in 1981. Construction of a special building is being completed this year, development of the software is being carried out and so on.

It is also planned to develop these systems during the 11th Five-Year Plan at Leningrad and Kiev and on the Northern Caucasus and Pridneprovsk Railroads.

Based on the developments carried out on the Moscow, October, Northern and Southern Urals Railroads and at PKTB TsUVT, an automated system for preliminary seat distribution for sale of tickets by the cashiers of all railroads of the system to transient passengers for trains dispatched from Moscow and Leningrad was put into operation in 1978. The system provides filling out applications for the necessary number of seats 10-5 days prior to dispatch of the trains from the Moscow and Leningrad terminals through the computer centers of the railroads by using the VTs of the Moscow and October Railroads.

It should be noted that, despite the significant difficulties and deficiencies in the work, this system satisfied up to 40,000 orders daily at Moscow and up to 7,000 orders daily at Leningrad during the first year of operation during the summer season. Measures to eliminate the revealed deficiencies are being considered on the basis of analyzing the operation of the system.

The capabilities of this system, we feel, have been far from exhausted. Following Moscow and Leningrad, it will be distributed to other railroads as well, primarily where there is mass generation of passenger flows.

The value of the system is that, not requiring significant capital expenditures, it provides interaction with similar systems on other railroads for filling the applications of passengers of their own railroad for the return trip or transfer passage through the cities of other railroads and distribution of seats for trains of their own formation in the preliminary sales mode.

Systems of the "Ekspress" type require large capital investments and will be developed in stages over a period of 10-15 years; therefore, automated systems for preliminary distribution of seats and sale of direct seat tickets will be distributed during the next few years.

Automated information retrieval systems for keeping a record and analysis of failures, diagnosis and forecasting the state of hardware are being developed within the framework of ASUZhT on the system.

Only some problems are now being solved for practical purposes. At the same time, a significant saving has already been achieved for these problems. Thus, the remaining life of diesel locomotive engines is diagnosed at almost all railroad VTs by means of computer from the results of spectral analysis of the crankcase oil and analysis of wear and tear and unscheduled repairs of locomotives. The need for repair is established in time as a function of the actual condition of the diesel as a result of determining the deviation of the composition of the crankcase oil impurities from the norms. The saving is up to 400 rubles annually per diesel.

Analysis of the causes of unscheduled locomotive repairs is also being accomplished by means of computers and preventive measures to improve the reliability of traction equipment are being worked out. This standard task has been developed by the VTs of the Northern Railroad on the basis of the YeS EVM and is being introduced in the entire system.

Machine analysis of malfunctions of electrical supply devices, worked out on the Eastern Siberian and Gor'ky Railroads, STsB [Signalization, centralization and block system] apparatus on the Alma-Ata Railroad and automatic locomotive signalling equipment on the Southwestern Railroad, is of interest. Standard information retrieval systems for recordkeeping and analysis of the technical state of the subassemblies and parts of locomotives, rail cars and upper structure of the track are being developed at the Gor'ky, Southern Urals, Southeastern and Kuybyshev Railroads and at PKTB TsUVT. VNIIZhT and the railroad services are participating actively in these investigations. It is planned to introduce these systems during 1980-1981.

The enumerated investigations comprise the basis of future automated systems designed to improve the reliability of hardware. Promising developments on technical diagnosis of locomotives are being carried out on the Gor'ky Railroad and developments on planning repair of rail cars at marshalling yards without separation are being carried out on the Southern Urals Railroad.

The investigations to develop the ASUZhT also include an extensive range of problems for automation of data processing for keeping records and analysis of the freight, handling and operational work of railroads, material-technical support and for bookkeeping and engineering-technical calculations when planning new objects and so on. Typical software for solving these problems has been developed and checked extensively.

Processing the data of statistical recordkeeping on computers significantly expands the information content of reports and permits analysis of the freight and handling work during any time segment and essentially to any extent for each of the influencing indicators. The optimum boundaries and extent of the required analysis have not yet been finally determined, but one can say confidently even now that extensive use of computers is transforming the recordkeeping system in railroad transport and will make it possible to combine operational and statistical accounting. In this case the necessary bookkeeping will be compiled with the frequency of operational accounting and with the information content of statistical accounting.

Machine processing of waybill data is now being carried out on 14 railroads by the method of the VTs of the Kuybyshev and Gor'ky Railroads. This work will be carried out by the VTs of all railroads before the end of 1980. Engineer block trains are being processed by computer on four railroads. Moreover, experimental calculations for a number of depots have been organized at four railroads. Development of a complex of programs for processing recordkeeping of ticket cash offices, waybill data and engineers block trains has been developed. Preparation of a typical packet of these applied programs will be completed in 1979, 1980 and 1981, respectively, which will permit completion of conversion of processing statistical bookkeeping on freight, handling and operational work of railroads to computers during the 11th Five-Year Plan.

Conversion to computers will be accompanied by receipt of additional information for calculation of rail car and passenger flows necessary for calculating the train marshalling schedule, the technical norms of operational work and dispatch marshalling schedules. Expenditures of manual labor for preparation of data will be reduced at the same time and this process itself will be converted from punch cards to machine tapes.

Valuable experience in automation of keeping a record of the presence and movement of materials and spare parts has been accumulated on the Southwestern, Sverdlovsk, Donetsk and Gor'ky Railroads. Keeping a record of material valuables and bookkeeping calculations for the main material warehouses of the railroads have been automated during the first stage. These tasks are now being introduced at three other railroads and the complex of programs is also being converted to the YeS EVM and automated systems are being developed for encompassing all material warehouses of the railroad.

The future ASU for material-technical support will permit not only a reduction of material reserves but also will significantly improve the quality of supplying the technical services with materials and spare parts and will thus increase the dependability of rolling stock, the upper structure of the track, energy supply and STsB devices and will also reduce the idle times of hardware during repair and preventive maintenance. This work will be carried out extensively on all railroads during 1980-1982.

The ASUZhT also includes complex automation of control of production processes, including development of an automatic engineer, automatic section dispatcher and ASU of hump-yard processes.

It should be noted that automation of direct production processes from scientific data confirmed by practice is 2-3 times more effective than traditional information retrieval systems. However, realization of them became possible after serial production of microprocessors was organized. Investigations in the field of automation of production processes are being conducted most actively in railroad transport on subways, they have still not emerged from the stage of scientific research and experiments on the mainline transport and, therefore, practical use of them on individual sections and then massive use should be expected in the future.

At the same time the problem of development of speed measuring devices and tract meters based on microprocessors or of those devices which are capable of recording the necessary parameters on magnetic carriers (or selection from those existing in the national economy) can now be solved. They will permit a significant improvement in the quality of measurement, will sharply reduce the periods of data processing and obtaining the results of analysis and will eliminate routine manual calculations.

There are serious deficiencies in investigations to create and develop ASU. YeS EVM are being assimilated slowly, typical design is being entrusted in some cases to inadequately qualified specialists, dispersion of cadres of developers by many topics is being permitted and development of the material-technical base is lagging behind the needs of the ASUZhT. All this reduces the effectiveness of computer use.

Measures are being planned and are being implemented on improving scientific research and design work and to increase the labor productivity of developers to solve the problems considered above and to eliminate deficiencies. Large working groups which include the most qualified specialists are being formed for the new standard developments. All the principle planning decisions and the main algorithms will be first discussed in the working groups or in the technical councils and will be included in the standard design only after this.

Development of structured programming and creation of a library of standard program modules and blocks frequently used in working out problems is of important significance for increasing the labor productivity of developers, the reliability and viability of program complexes and to ensure simplicity of debugging, assimilation and variation of programs. Structured programming provides for division of programs of any complexity into elementary procedures, the number of which is limited, while the structure is strictly standardized. Formulation of documents is also strictly standardized with compulsory development of macro- and microblock-diagrams of algorithms. In this case the programs become understandable to specialists, like drawings for designers.

The working group of specialists of PKTB TsUVK, MIIT and VTs of the railroads is designing a typical system for input and formation of data bases and for developing resultative output forms. Introduction of this system, planned for 1980, will reduce by 30-40 percent the labor expenditures for planning tasks on the YeS EVM.

Much attention is being devoted to development of technical operation of the YeS EVM and to creation of an extensive network of information terminals. Not only must they be provided with stable operation, but the optimum structure and composition of the hardware must be selected for the railroad VTs and the ASU of marshalling yards, remote processing problems must be solved, extensive exchange of experience of preventive and diagnostic work must be organized, the VTs must be outfitted with monitoring and measuring equipment, conversion to medium-speed data transmission must be provided, justified norms and standards for performing various types of work, consumption of materials and spare parts must be developed and so on.

The considered main trends of work to develop the ASUZhT of course do not encompass all the problems which must be solved by specialists of computer technology in close cooperation with workers of all the main railroad management facilities, but they are the most important at the given stage and the main labor and material resources of the computer centers and the PKTB TsUVT will be concentrated in them.

In fulfilling the decisions of the 25th CPSU Congress, the workers of computer equipment facilities are increasing the level of organizing work, are introducing purposeful planning at all VTs, are expanding the use of the achievements of scientific organization of labor and the leading experience of the best collectives, are strengthening productive ties with the user services of ASU and are waging continuous work to increase the effectiveness of using computers and ASU.

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## DETERIORATION OF VOLGA TANKER FLEET

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Oct 79 p 2

[Article by V. Permyakov, Chief of the "Volgotanker" Steamship Line: "Why Is the Fleet Getting Old"?]

[Text] Again and again I have read over the report, and in no way do I wish to reconcile myself to the conclusions made by the representatives of the River Register. The conclusions are categorical, and they state that during the last 4 years of the 10th Five-Year Plan the technical condition of the Volga Petroelum Tanker Fleet became worse. But what exactly happened?

The first and, in my opinion, a very serious cause of the worsening of the fleet's technical condition is the fact that the steamship line's enterprises --the shoreline repair plants--are not able to carry out routine maintenance and major ships' repairs on schedule and to the fullest extent necessary. The development of these plants has lagged behind the growth rate and renovation rate of the fleet. Most of the steamship line's enterprises were created on the basis of small-scale workshops. When these were modernized, they inherited some old, unproductive equipment.

Moreover, the volume of repair operations in its profile is planned from above: within the total plant programs repairs account for no more than 20-40 percent. It is quite obviously unfeasible with a shortage of repair capacity to provide for even less amounts of work in the plans. But such proportions in planning took shape about 15 years ago, when steamships and barges were replaced by modern tanker and tugboat fleet. During the first few years of its operation this new fleet did not require too much care. And the volume of ships' repairs was immediately lowered at the plants. So that the enterprises should not stand idle, the RSFSR Ministry of the Riber Fleet was compelled to replenish their workloads with new construction of ships and machinery. The plants very soon acquired a "taste" for this part of the program, and they began to accord it preference. You see, the new shipbuilding makes it possible to organized delayed production. And the labor productivity therein is 30-40 percent higher than it is in repair operations.

Each year the volume of the shipbuilding program continued to grow. And this is why the steamship line was compelled to remove 50 units of the transport fleet from the repair schedule.

During the shipping season of the current year alone 10 tankers operating on the Aktau-Volgograd Line were not allowed to go out to sea because of insufficient hull strength. The metal of which these ships were made had been subjected to a strong attack by corrosion. Unfortunately, we still do not have effective means to combat corrosion. And the existing methods of renovating the technical characteristics of hulls are too expensive, labor-consuming, and impractical, since they prolong the service life of a tanker by some 5-6 years but with a 10-percent loss of cargo capacity. Specialists have calculated, for example, that in order to renovate the hull of a "Volgoneft-48"-type tanker, more than 2,000 sq. meters of sheathing would have to be replaced. The cost of such a capital repair job amounts to 500,000 rubles! This sum is fully sufficient to build two petroleum-carrying barges with a cargo capacity of 10,000 tons. Nevertheless, the steamship line was compelled to make these large outlays--there was no other recourse. Practical experience has shown that ships' steel does not withstand the aggressive environment which petroleum products and their vapors create. A vessel goes out of operation much sooner than the theoretically set amortization period of its use.

This problem is further exacerbated by the fact that tankers are built of metal with minus thickness tolerances of from 7 to 9 percent. It turns out that while they are still in the shipbuilding slips the time periods of tankers' use are being shortened by from 3 to 4 years. And if we take into consideration the fact that in building the ships the metal is not protected against corrosion, we can decidedly add yet another equal amount to these years. We cannot understand why the enterprises of the Ministry of the Shipbuilding Industry make such poor use of Soviet and foreign achievements in the struggle against corrosion.

We do understand that we shall not soon succeed in modernizing plants which have unproductive equipment. Hence, we are seeking for internal resources. The Ships' Repair and Shipbuilding Plant imeni Lenin of the RSFSR Ministry of the River Fleet has proceeded with initiative to use the aggregate-unit method in carrying out fleet repairs. This method greatly reduces the time periods required to do the work. We, however, have not achieved the needed capacity: we have been very adversely affected by a poor supply of interchangeable and spare parts. During the past few years our orders have only been filled by one-third at the most. Here are some figures: out of 53 fuel pumps ordered during the current year for the "6Ch-1822" engines only 6 were allocated, 740 piston pairs were ordered, and only 190 were issued to us.

Since it found itself in an almost desperate situation, the steamship line decided to have its enterprises specialized in certain forms of repairs. In the Astrakhan group we planned to organize the renovation of hulls, the repair of engines, electrical equipment, and so forth. But this restructuring did not work out successfully either. One plant did not incorporate hull repair into its production plan because it has a program of shipbuilding approved by the ministry. Two other enterprises are not able to master the proposed volume because of an acute shortage of production capacities.

Now we have adopted the course of developing ships' repair bases on the Upper Volga, where a portion of the fleet will be transferred. But the emergence of new enterprises is proceeding too slowly. Up to the present time we have been unable to find general contractors who would include in their own plan the construction of a repair-and-operations base in the Works and of a shoreline production section in Yaroslavl'. Because of the lengthy time periods required to coordinate the draft plan documentation the introduction of the second phase of the Blagoveshchensk Repair-and-Operations Base is being postponed until the 11th Five-Year Plan.

The lack of up-to-date ships' repair bases in these regions has a negative effect on the technical condition of the fleet. In our opinion the RSFSR Ministry of the River Fleet ought to have an overall plan of development of shoreline enterprises for the 11th Five-Year Plan.

And there is still one more idea which I would like to share with you.

The course which was taken in its time of developing the tanker fleet aided in the rapid mastery of mixed hauls in accordance with the "river-sea" variant. But therein was an almost complete disappearance from the field of vision of the non-self-powered, very profitable fleet, with whose help 85 percent of all petroleum products were hauled. In my opinion an increase in barge construction would have made it possible to cope even with the growing volume of hauls and would have removed the tension in the plans of the ships' repair plants. Because, you see, the technical maintenance of a non-self-powered fleet is much simpler.

In the decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" it is noted that the most important trends for improving the entire plan operation consist of selecting the most effective ways to achieve high end results for the national economy, a rational combination of sectorial and territorial development, long-range and current plans, as well as improving the intersectorial and intra-sectorial proportions. Taking this into consideration, the USSR Ministry of the River Fleet ought to re-examine the system of planning the work of the industrial enterprises and equalize in the plans the volume of ships' repair and that of new shipbuilding and machine building.

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# TRANSPORTATION

## WATER TRANSPORT IN KARELIA

Moscow PRAVDA in Russian 27 Oct 79 p 2

/Article by Chairman of the Karel'skaya ASSR Council of Ministers A. Kochetov (Petrozavodsk): "Seven Feet Under the Keel"/

> /Text/ A cursory glance at the map is sufficient to be convinced of how rich our northwest is in main waterways. For example, Karelia in the number of kilometers of river routes with guaranteed depths exceeds by threefold the average indicator of the country. Its large lakes are connected into a unified system, which makes the piers of cities and settlements accessible. The White Sea-Baltic Canal, which crosses the republic, is of statewide importance: it provides an outlet to the northern sea route. While the Volga-Baltic Waterway leads from Karelia to the center. There is a reliable link with Leningrad through lakes Svir' and Ladoga. So not only river, but also sea ports are open for the White Sea-Onega Steamship Company. For this reason ships of the "river-sea" type are used extensively here.

What is required for the efficient work of the water transport workers? Not only the availability of reliable routes, but also good modern ships and a port service equipped with machinery.

Great improvements have occurred in recent years. The traffic volumes have been constantly increasing. This is all the more important at that moment when there are not enough railroad cars. During the years of the Ninth Five-Year Plan alone the volume of cargo shipment on ships of the White Sea-Onega Steamship Company increased 34 percent, while the freight turnover increased 66 percent. These indicators are also increasing during the 10th Five-Year Plan. At present the water transport workers within the republic are already performing a volume of cargo shipments, which is the same as with rail transport.

But, nevertheless, the achievements could have been more significant. We are now lagging behind the growth rate of shipments, which was planned for the 10th Five-Year Plan. What is the reason? How can the transportation potential of the Karelian water transport workers be utilized more completely?

Long-distance cargoes were mainly relied on. We have in mind the service which connects the regions of the Kola Peninsula and Karelia, which are rich in raw materials, with the center and the southern part of the country. Iron ore concentrate for the Cherepovets Metallurgical Plant and Kola apatites for chemical enterprises are the main cargoes, the proportion of which in the future according to the volume of shipments should be about 22 percent. But the planned increase so far is not occurring.

The delay in the start-up of special transshipping piers in Cherepovets and Astrakhan' is to blame for everything. Iron and apatite concentrates, which the complexes operating in Kandalaksha and Medvezh'yegorsk are able to ship in enormous quantity, cannot be handled here. But, after all, all the complexes for the transshipment of bulk cargoes in different cities should be put into operation at the same time. It did not turn out that way. The gap was several years. And, as a result, the combines in Kandalaksha and Medvezh'yegorsk are operating at half capacity.

It is necessary to see how the automatic port for apatite concentrate in Medvezh'yegorsk is operating, in order to evaluate its merits. Here the cars move onto a special trestle and are automatically unloaded, and the apatite concentrate through a system of conveyors in covered tunnels pours into the holds of the ship. Everything is accomplished by the push of a button, the number of service personnel has been reduced to a minimum. The planned intensity of work is 2,000 tons of concentrate an hour. During the navigation period the complex is capable of transhipping 3 million tons. In short, everything is designed for a large production impact. The complex is showing its best side. But, unfortunately, it is idle more than it is working.

And all this is because the special transshipment piers for the apatite flow have been put into operation only in Perm'. For a long time there were no transshipment machines. The Ministry of Heavy and Transport Machine Building dragged out the solution of the problem and did not place orders for the production of the units. V. Ivanenko, chief of the Main Administration of Ports of the RSFSR Ministry of the River Fleet, had to appeal repeatedly to Gosplan and to complain to the USSR Committee of the People's Control. Headway began to be made. But the matter is now being hampered by the construction workers. As a result, the potential of water transport is not being taken full advantage of. As before, simultaneously with the blue arteries raw materials are being carried in large quantity by rail.

The specialists made one estimate and set to thinking. It turned out that if steps were not taken, the effectiveness of the use of mixed rail-water traffic in the future would be low. Take the Cherepovets Metallurgical Plant. Next year they will begin to deliver iron concentrate here by water only in the amount of one-tenth of the demand. They will deliver 12 percent of the apatite for enterprises of the country via the Volga-Baltic

Waterway. This is inexcusably too little! This is happening, in our opinion, due to the fact that the ministries of ferrous metallurgy and the chemical industry approach departmentally and not comprehensively the solution of the transportation schemes of the supply of their enterprises with raw materials.

Comprehending the facts, you become convinced that general plans of development for the long-range future, which have been drafted and approved for different regions, are necessary. In them it would be possible to provide completely for the development of productive forces and economically sound transportation plans for the delivery of raw materials and finished products. In our opinion, USSR Gosplan needs a coordinating and monitoring organ which has been assigned the necessary rights. Or else what happens? When constructing and renovating enterprises the industrial ministries do not examine at all or examine last of all the questions of transportation.

Here is clear confirmation of this. It is known that the second resource of Karelia following timber is stone. Many construction projects and cities need gravel, decorative granite and marble. And all this is available. But it is difficult to remove it. The railroad is not managing it. It would seem that in such a situation it is logical to depend on water transport. But there are not enough berths in the region of operation of the quarries. And where they are available, they are equipped with obsolete machinery, or have nothing at all. Even the new enterprises of the ministry are not trying to "link up" to the waterways. For example, last year the RSFSR Ministry of the Construction Materials Industry put into operation 20 km from Lake Onega a mighty complex for the production of gravel in the amount of 2 million tons a year. It is being sent, apart from the republic, to Moscow, Gor'kiy, Arkhangel'sk and other cities. But how? With enormous effort due to the shortage of railroad cars.

Or take another example. In northern Karelia capacities for the mining of iron ore will soon be put into operation. Pellets will be shipped from Kostomushka to Cherepovets. It must be stated that the transportation ties of this works are also oriented one-sidedly only toward the railroad.

Of course, salvation lies not only in modern piers. A new highly productive fleet is also needed. For the present the White Sea-Onega Steamship Company is receiving an annual reinforcement of six or seven motorships. But a reduction of the supply of ships is being planned, which in no way can be permitted. Let us image that today all the berths spoken about above have been built and are in operation. Would the fleet of the steamship company be able to deliver from them all the cargo to the necessary addresses? It can be said with complete certainty that there are not enough ships for these shipments.

Everyone knows the great effectiveness of freight traffic in "river-sea" through service. That is how timber is delivered from Arkhangel'sk to Kaliningrad and Kalypeda for the Baltic pulp and paper combines and lumber is delivered for export. What do we gain? We bypass transshipment at the estuarial ports. We maintain the quality. We shorten the delivery time. We free railroad cars. That is how many trump cards there are in some hands! There is only one bad thing--there are not enough ships for such shipments, they must be increased two- to threefold! The reinforcement of the fleet should be coordinated by the RSFSR Ministry of the River Fleet with the proposed volumes of freight traffic. And this must be done beforehand. New ships, for example, woodchip carriers, are also required.

The river transport workers, of course, also have their own internal reserves for increasing the traffic volumes. The main way is to shorten the layovers of the fleet for loading and unloading. But these layovers are still long, especially at the berths of clients. Their low technical status and poor supply with machinery are to blame for this. For example, at the berths of the Karellesprom Association and at the Segezha and Kondopoga pulp and paper combines the superships are handled by five-ton cranes. As they save, a teaspoon an hour. After all, a day's layover, for example, of a motorship like the "Volgo-Balt" is equivalent to the layover of 50 railroad cars. And in the river fleet, along with ships, people are also idle. We believe that problem number one is to shorten the time for cargo handling. It should be raised to the statewide level. It is necessary to equip all the berths with more powerful modern machinery.

The river transport workers are bearing considerable losses due to the delay of the fleet for repair. Here, too, there is a reason--the base has become weak for modern ships. Apparently, it is difficult to set up in each basin enterprises at which the repair of ships would be carried out in shops by the flow-line method. It would be advisable to built large regional yards, leaving to the existing enterprises only routine maintenance and maintenance by the crew while sailing.

These are the responsible tasks facing the water transport workers. They will have to be solved jointly with the ministries which are interested in the freight of the north. Recently the Bureau of the Karel'skaya Oblast Committee of the party examined many problems of the water transport workers. It was noted what must be done first of all and in the future. The enterprises, departments and interested ministries were informed of all of this. The coordinating council attached to the republic Council of Ministers was commissioned with the leading transportation organizations and the Karelian Branch of the USSR Academy of Sciences to draw up long-range plans of the development of shipments and the increase of the turn-round capacity of berths. It is important for all of this not just to remain on paper, but to be implemented.

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## TRANSPORTATION

### USE, DEVELOPMENT OF MOSCOW'S METRO AND SURFACE TRANSIT NETWORKS VIEWED

Moscow VOZDUSHNYY TRANSPORT in Russian 14 Oct 79 p 4

[Article by B. Belkin, editor-in-chief of the journal GORODSKOYE KHOZYAYSTVO MOSKVY: "How Many Years Old is the Moscow Streetcar?"]

[Text] Nearly 20 million trips are made daily by Muscovites and guests of the capital on Moscow's municipal transport.

The beauty of the Moscow metro is well-known to the entire world. The lobbies, walls and columns of the stations are adorned with marble, rhodonite, granite and other valuable materials. But this is not, of course, the main fact. Each day the light blue expresses of the "underground" haul 6.5 million passengers and, on certain days, 7 million. By right the metro remains the Number One means of transport in the capital, the most rapid and convenient way to travel. It has been transformed into a veritable underground city with numerous installations and services. The length of its lines has increased to almost 181 km.

But, all the same, no matter how rapidly the network of main underground highways might develop, housing developments are appearing even more swiftly on the map of the city. How does one provide for the rapid transport of the residents of new regions? In the case in question, the motor bus, trolleybus and streetcar are coming to the aid of the metro. Thus, 15 to 20 new routes are being opened up for surface transport each year in Moscow, in the main in new regions that are being massively built up with residential construction, to which metro lines have yet to be laid. Up to 32,000 people are carried out from each such region during the rush hour.

After the metro, the most passengers in our capital are transported by motor bus. Nearly 5 million Muscovites and guests of the capital make daily use of its services. A motor bus is a handy vehicle. But it has one serious defect. Its engine tosses an entire "bouquet" of noxious exhaust gases into the air. This is why motor buses that use condensed (liquified) gas as a fuel have appeared on the streets of the capital. They pollute the air to only nearly one-quarter the extent of the others. Furthermore, gas-powered motor buses are considerably more economical than their gasoline and diesel confrères.

And then there are the trolleybuses that utilize electricity as a "fuel," which fully meet the ecological requirements. Running along 75 routes in the city, they do not pollute the atmospheric basin at all. In terms of the number of passengers hauled, the trolleybus stands in third place. Nearly 3 million people make use of its services daily.

Among all the forms of passenger transport in the capital, the most venerable in terms of age is the streetcar. During the current year it marked its 80th anniversary. "Grandfather" streetcar, as city dwellers call it, as before, performs its service punctually. Only you won't see it any longer in the center of Moscow. The streetcar has "moved" along with the new settlers into regions being massively built up with residential housing. The streetcar has a new task--hauling the inhabitants of new construction projects to the nearest metro stations. And it is coping with it marvelously, transporting more than 1.7 million passengers a day. Thus it is that "grandfather" will continue henceforth to serve the city.

In telling about Moscow's transport, one cannot fail to mention the taxi. Muscovites and guests of the capital are now served by nearly 17,000 comfortable and fast "Volgas." And in the not too distant future there will be 25,000 of them. In addition, there are as of now 55 lines of trunk-route taxis operating in Moscow. During the day the micro-motor buses haul more than 70,000 passengers.

Less than a year remains to the beginning of the 22nd Olympic Games in Moscow. The capital's transport workers have been preparing for a long time now for this grand sports forum. By 1980 the length of subway lines will increase to 196 km. Prior to the beginning of the games, 50 new motor bus and trolleybus routes will open up in Moscow. Several thousand passenger cars and motor buses will be allocated additionally by the city to serve the participants and guests of the Olympics. Muscovites are attempting to provide for each little detail in order to ensure that transport services will operate at a high level.

And how will our city's transport develop in the future? In order to answer this question, it is necessary to glance at the master model for the development of the Moscow transport hub. The main flow of passengers, just as now, will be carried by the metro. Moreover, its share in the total volume of transport will grow to 43 percent. The length of the network of surface forms of transport will increase substantially. On the whole, the density of the public transport network will grow in the future to 1.6 times what it is now, which will enable Muscovites to get from the most remote of the outlying locations in the city to the center in 30 to 35 minutes.

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# DEVELOPMENTS IN RSFSR URBAN ELECTRIC TRANSPORT CITED

Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE KHOZYAYSTVO No 10, Oct 79 signed to press 3 Oct 79 pp 24-26

/Article by S. M. Ionov, RSFSR first deputy minister of housing and municipal services: "The Urgent Tasks of RSFSR Transport Workers"/

/Excerpt/ As of 1 January this year, municipal urban electric transport was operating in 89 cities of the RSFSR, including trolleys in 55 cities and trolley buses in 75. There are 5,417 kilometers of trolley lines and 6,864 kilometers of trolley bus lines.

There also is electric transport within the RSFSR which belongs to different departments (trolleys in 14 cities and trolley buses in two cities).

Passenger transportation in the major cities of the RSFSR is being provided at this time in accordance with scientifically based, comprehensive long-range programs. They were established by the Giprokommundortrans /State Institute for the Planning of Municipal Road Transportation Structures/ and other planning organizations.

Significant changes have taken place in the sector over the past 3 years of the 10th Five-Year Plan. Thus, capital investments of 202.7 million rubles have been assimilated for its development. Some 474 kilometers of trolley lines, 806 kilometers of trolley bus lines, and 27 trolley and trolley bus stations have been built and renovated. Trolley bus service has been begun in Al'met'yevsk, Volgodonsk, Dzerzhinsk, Novokuznetsk, Ordzhonikidze, Rybinsk and Taganrog. The Voronezh Rolling Stock Repair and Spare Parts Manufacturing Plant was put into operation in 1977. The technical equipment of enterprises has been improved: 2,486 trolley cars, 3,050 trolley buses, 256 specialized and emergency vehicles, 37 snowplows, and 443 machine tools were received. The USSR Ministry of the Construction Materials Industry has supplied 500,000 reinforced concrete railroad ties to trolley services. Old-type trolley buses have been taken out of service completely.

Fulfillment of the planned targets, as stressed at the November Plenum of the CPSU Central Committee, is crucially important for the success of the 10th Five-Year Plan as a whole. The collectives of urban electric transport enterprises are actively takeing part in socialist competition.

The Volgograd Trolley and Trolley Bus Administration is rightfully included among those on the right flank of the five-year plan. The progress of this administration over the past year has been marked by a challenge red banner of the RSFSR Council of Ministers and the AUCCTU. Volgograd workers are working at an even, stable pace this year, too.

Things are going well at the Ryazan' Trolley Bus Administration, the collective of which earned class places in competition three times last year.

The Volgograd, Leningrad, Kazan', Kuybyshev and Sverdlovsk trolley and trolley bus administrations, the Novorossiysk and Ryazan' trolley bus administrations, and the Angarsk Trolley Administration became winners in the first and second quarters of this year.

Last year RSFSR urban electric transport carried 9.8 billion passengers (101.6 percent of the plan). The proportion of trolleys and trolley buses in the overall volume of urban passenger transportation was 33 percent; it exceeded 70 percent in major cities such as Chelyabinsk, Rostov-na-Donu and others.

Compared with 1977, the amount of rolling stock put in service was increased, its cruising speed was increased, the extent to which rolling stock was filled to capacity was reduced, and returns of trolley buses were reduced.

However, service to the people in a number of cities still does not meet the needs of the time. During rush hours the rolling stock is overcrowded as usual, and the speed, frequency and regularity of trolley and trolley bus service leave much to be desired.

Rolling stock in Kaliningrad, Khabarovsk, Arkhangel'sk, Noginsk, Ulan-Ude and Shakhty is being used unsatisfactorily. Returns of trolley cars because of technical malfunctions have increased in a number of services. This is caused by lack of proper attention by enterprise managers and local soviet and municipal organs to matters of the effective use of available capacities and development of a maintenance base.

The condition of trolley tracks also continues to remain unsatisfactory. The number of trolley car derailments in Biysk, Gor'kiy, Kemerovo and Omsk has increased significantly. According to the data of an intensity evaluation, the condition of tracks in Krasnoyarsk, Novosibirsk, Taganrog and other cities has become worse. Most often this is caused by defects in rail joints, faulty wooden ties, and deviation from the norms for maintaining the track gage.

Last year the organization of major overhaul operations improved somewhat, which made it possible to utilize 9.5 million rubles of depreciation deductions. In conformity with the ministry's order No 199 of 6 May 1977, a number of services have been carrying out major repair and renovation of track with repair and construction sections created in 36 trolley and trolley bus administrations. This has made it possible not to draw railwaymen away from their immediate daily duties and improve current track maintenance by this means.

Major repair and renovation of trolley track in Voronezh, Kazan', Sverdlovsk, Perm' and Smolensk have been carried out most successfully. At the same time, some lagging behind the target for welding rail joints, especially in Biysk, Salavat and Shakhty, has been permitted. At this time the matter of centralized allocation of funds to the services of trolley-trolley bus and trolley administrations for electrodes has been favorably resolved.

Last year the incorporation of reinforced concrete ties was continued during major track repairs. There are services where 60 percent of the track has been laid on reinforced concrete ties.

The experience of the Tula TTU /Trolley and Trolley Bus Administration/, where student construction detachments have been working on major repairs for several summer seasons, merits attention and dissemination.

At present, the power supply for urban electric transport is being furnished by 932 power substations with a total installed capacity of 2.4 million kilowatts. In the 1976-1978 period, 169 power substations were put into operation to improve the power supply.

Remote control by power substations has been introduced in Moscow, Leningrad, Kuybyshev, Yaroslavl', Novosibirsk, Saratov, Tula, Omsk, Kaliningrad, Sverdlovsk, Astrakhan', Pyatigorsk and Cheboksary.

This year equipment for remote control is being earmarked for Kalinin, Krasnodar, Voronezh, Novosibirsk, Chelyabinsk and Penza.

Urban electric transport is one of the largest consumers of electric power. In three and a half years of the 10th Five-Year Plan, trolleys and trolley buses of the RSFSR have consumed 12.5 billion kilowatt-hours. Over the same period 316.5 million kilowatt-hours were saved. In this way, the target for additional savings of electric power in the RSFSR as a whole has been fulfilled. However, excessive consumption was permitted in the first half of this year in Novokuznetsk, Chita, Orel, Saratov, and a number of other cities.

As an inspection by the Rosremelektrotrans Association has shown, the reason most often is the poor presentation of educational and training work for motormen in observing driving efficiency and in the irregular monitoring of specific tractive resistance and tire pressure on trolley buses.

The Ministry of Housing and Municipal Services is striving to achieve a zealous, proprietary relationship toward electric power. In 1978, reports on this matter by the Lipetsk, Tambov, Arkhangel'sk, Tomsk, Sverdlovsk, Chita and Penza oblupravkomkhozy [oblast administrations of municipal services], the Stavropol' kraykomkhoz [kray division of municipal services] and the Rybinsk Trolley Bus Administration were heard by the ministry's collegium.

It is difficult to overestimate the importance of a well organized and efficiently operating system for the management of rolling stock traffic. Understanding this well, the managers of a number of services have achieved certain progress. Transport divisions have been established as part of gorispolkoms in 39 cities. Central traffic control stations have been built in Ul'yanovsk and Izhevsk. This year TsDS's [central traffic control stations] are being put into operation in Kuybyshev and Krasnodar, and they are being built in Astrakhan', Kursk, Lipetsk, Novosibirsk and Ryazan'. Planning estimates for construction have been drafted and approved for a group of other cities. The functions of the principal customer in the planning and construction of TsDS's have been entrusted to the RSFSR Ministry of Motor Transport. The RSFSR Gosplan has been committed to allocate to this ministry the necessary equipment and physical resources, and the councils of ministers of ASSR's, krayispolkoms and oblispolkoms have been committed to make capital investments available for proportionate participation in construction of the TsDS's. Delay in implementing this important measure is caused by the lack of proper urgency by managers of municipal organs and trolley and trolley bus administrations.

Transport workers of the RSFSR are now actively preparing for winter. The past winter tested urban electric transport's fitness for operation rigorously as never before, and without allowances for the carelessness and incompetence of individual managers.

When temperatures dropped sharply at the end of December and the beginning of January and large amounts of snow were accumulated, the operation of trolleys and trolley buses in Ul'yanovsk, Tyumen', Kaliningrad, Kursk, Al'met'yevsk and certain other cities deteriorated significantly.

Because of untimely inspection and replacement of lubricant in reduction units and slipping [buksoviye] and other antifriction bearings, the lubricants thickened during prolonged periods of settlement at night when trolleys and trolley buses were not removed for protection. This led to disruption of the morning departure of rolling stock for service.

In Ul'yanovsk the situation was further complicated by a heavy snowfall and gusty winds. In carrying out the thoughtless instructions of managers, trolley motormen attempted to move along snow-covered tracks, which led to severe slipping by wheel pairs and, as a consequence, the development of a flashover on the commutators of traction motors, breakdown of the insulation of armatures and pole coils, and overheating of accelerators and resistors by increased currents in the cars' power circuit.

In some cities, damage to rolling stock was caused by operation on sections of track flooded with water.

In a number of cases, the lack of supplies of oil and lubricants was caused by a shortage of containers. The ministry provided assistance to these services, but the stern lesson of the past winter demonstrated that everything depends on correct and timely organization of operations. In fact, under the same conditions there were no "chp" [extraordinary occurrences] at all in Volgograd, Sverdlovsk, Perm' and other cities.

It needs to be noted that full personnel strength has considerable influence on the stability of electric transport enterprises' operations. Where conditions have been created for productive labor and a rest period during the shift, a hot meal has been provided, there are children's preschool institutions and housing has been built, personnel turnover has been reduced practically to zero.

For many services, the use of trolley cars in a multi-unit system driven by one motorman acquires special significance. Up to 80 percent of the cars in Tula and Leningrad operate under this system. At the same time, nothing has been done about this in Taganrog, Krasnodar, Omsk, Chelyabinsk and other cities.

Resolution of these problems, directly linked with the working and everyday living conditions of the workers, is in the hands of local soviet and municipal organs and to a significant extent depends on the initiative and persistence of the managers of trolley and trolley bus administrations.

Formulation of a capital construction plan for 1980, the concluding year of the five-year plan, is under way at this time in ASSR's, krays and oblasts. As this takes place, it is necessary to provide for completion of stations, track repair shops and power substations needed to eliminate the disproportion in development of the maintenance base and power supply and central traffic control stations.

Particular attention should be devoted to organization of terminal stations, as well as to eliminating delays in the construction of trolley and trolley bus lines which have been permitted. It is very important to provide for assimilation of capital investments to the full extent. Neither construction organizations nor customers should put up with any kind of "compromise" solutions.

Many trolley and trolley bus enterprises (in Leningrad, Kazan', Cheboksary, Ufa and so forth) are successfully working to improve the system of wages for maintenance personnel. The establishment of complex brigades for the maintenance and technical servicing of rolling stock, assignment of trolley cars and trolley buses to them, and increasing the proportion of bonus incentives for high quality in maintenance and inspection in the wage organization structure are yielding positive results.

For example, in the trolley administration of Angarsk, which is operating under the new system of planning and economic incentive, brigades for neutral inspection and inspection and routine maintenance and car washers and janitors have been shifted to piece-rate wages in accordance with consolidated evaluations for each inspected car. A bonus is paid for each car which has been operating until a scheduled maintenance or inspection without being brought in for unplanned repair. The apportionment of earnings and bonuses is carried out in accordance with the work participation coefficient of each member of the brigade in the results of the overall work. This increases the responsibility of each one for fulfillment of the target.

Here they have been striving to bring about a situation in which every motorman, mechanic and maintenance worker is clearly aware of which components and amounts form the basis for his earnings. This unquestionably contributes to improvement in the efficiency and quality of the work. As a result of such a practice, returns of trolleys from service for technical malfunctions have been reduced in Angarsk.

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## BRIEFS

KIRGIZ AT BAM--The ten best komsomol member workers of the Frunze section have been sent to the operating Tynda-Berkanit sector of BAM. The detachment is led by the team leader of the Pishpekstaya district A. Chernyshev. [Text] [Moscow GUDOK in Russian 5 Oct 79 p 4] 2959

BAM CONSTRUCTION--The workers of the station Detskoye Selo have carried out an honorable assignment. For the first time a train was formed here which was sent by direct route to BAM. Field houses for the builders of the railroad of the century were placed on the 53 platforms. All 7.5 kilometers of the train reached Tundri without having the cars disassembled at intermediate stations. [Text] [Moscow GUDOK in Russian 17 Oct 79 p 4] 2959

PASSENGERS ON BAM--Chegdomyn (Khabarovskiy Kray). A new page has been written in the biography of BAM. Yesterday regular passenger service was opened on a 145-kilometer section between the stations Urgal and Gerbi. The trains on this sector have been entrusted to the best engineers on the line's eastern shoulder A. Matusevich, S. Likhachev, N. Tsopkov, and I. Drapak. [Text] [Moscow TRUD in Russian 4 Oct 79 p 1] 2959

ELECTRIFICATION ALONG BAM--Technological tests of an original arrangement for installing wires on electric transmission lines have been completed at the western sector of BAM, on the Severo-Baykal'sk-Muyskiy Tunnel tract. The new method was developed to fill an order from the USSR Ministry of Energy in the All-Union Scientific Research Institute for the Use of Aviation in the Economy of the USSR Ministry of Aviation. "Helicopters have given an excellent account of themselves in installing electric transmission lines in inaccessible areas of Siberia, BAM, and Sakhalin," says the chief engineer of the Glavvostokelektroset'stroy V. Nayanov. "In the tundra and tayga we used them to mount poles and to move equipment and materials. And those places where wide use is made of aviation construction periods are cut almost in half. And now the helicopter has obtained still another specialty. Today in order to lay wire we use a tractor along the line. This means, of course, building a road. The innovation makes it possible to do without it." A special coil -- an unrolling device -- is attached to the external mount of the MI-8.

Flying from pole to pole, the helicopter lays the wire directly on them. Two kilometers in 35 to 40 minutes. The efficiency of this method is obvious. After some additional work is done on the equipment and crews are trained it is planned to make wide use of helicopters on electric transmission lines in Siberia and the Far East. [Text] [Moscow IZVESTIYA in Russian 14 July 79 p 3] 2959

SCHOOL BUILT IN TAIGA-- The construction of the school began in the station settlement of Dzhamku in Khabarovskiy Kray (the eastern sector of the Baykal-Amur mainline). A complex of buildings and structures is being built by a collective from the "BAMstroy" administration of the "Volgogradtyashstroy" trust. [Text] [Moscow IZVESTIYA in Russian 19 Aug 79 p 2] 2959

SPECIAL REPAIR TRAIN--This unusual train consisting of a "flyer" and two small platforms can now be seen on the tracks of the Omsk railroad network. It is as yet the only one on the railroads. Created by a group of rationalizers from the Omsk district of the Western Siberian Railroad, the repair train performs a large complex of track operations. The equipment of its "flyer"-car makes it possible to cut and weld and to drill and polish rails, and the unit with the bucket loader and platform moves and unloads sand, earth, and snow. Thanks to its all-purpose equipment, the train will be able in a year to perform an amount of track and cleaning work equal to 5,000 man-days. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jul 79 p 2] 2959

HIGH-SPEED TRAIN--Soviet engineers have created a new train, the "ER-200," which is capable of going at a speed of 200 kilometers per hour. The express will go between Moscow and Leningrad. Many of the engineer's duties will be taken up by automatic equipment. And the engineer will supervise the equipment. [Text] [Moscow KOMSOMOL'SKAYA PRAVDA in Russian 7 Jul 79 p 4] 2959

EFFICIENT LOCOMOTIVE REPAIR--Riga. The Daugavpilss Locomotive Repair Plant imeni Ya. Rudzutak is one of the most highly mechanized enterprises in Soviet Latvia. The repair workers try to make the best possible use of the possibilities of the plant equipment. This helps them to struggle more successfully to increase labor productivity. Thus, at the request of the collective, the enterprise's management has decided to increase the production program by 200,000 rubles on the basis of speeding up the work rates of the locomotive repair conveyor flow line. The work in the new manner has proven to be very efficient. Now, almost without increasing the capacities of the plant, the locomotive repair workers will be able to restore around 65 additional diesel locomotives a year. [Text] [Moscow IZVESTIYA in Russian 15 Oct 79 p 2] 2959

HEAVIER TRAINS--For five months now heavier and longer trains have been plying the Kashira section. More than 800 of them have already been made up and more than 600,000 tons of above-planned freight have been moved. The average weight of a train has been increased by more than 100 tons. Today many more heavier and longer trains are being made up and sent out every day than in January and February when the Moscow method of running large-capacity trains was begun. [Text] [Moscow GUDOK in Russian 15 Jun 79 p 4] 2959

CEMENT-FREE CONCRETE--Scientists from the Moscow Construction Engineering Institute have created a cement-free concrete. Perlite sand dust serves as the binding element in the new material. The concrete withstands large loads and temperature fluctuations. The largest perlite sand deposits are located in Buryatiya from which it will be sent to the construction sites of the Baykal-Amur mainline. [Text] [Kiev RABOCHAYA GAZETA in Russian 11 Apr 79 p 1] 2959

PROGRESSIVE WORK METHOD--By the time that the mass movement of heavy trains had been organized on most of the sectors of the capitol's line a large amount of work had been performed to strengthen the base technical servicing and control points where the inspection and repairing of the cars has been organized according to the multi-group and multi-them methods. As a result, more than 80 inactive technical servicing points have been eliminated and the guaranteed non-stop movement of trains has been substantially lengthened. [Text] [Moscow GUDOK in Russian 15 Jun 79 p 4] 2959

NEW PASSENGER DIESEL LOCOMOTIVE--Glistening with fresh paint, the one-thousandth TEP-60 passenger diesel locomotive set out on its first run through the gates of the diesel assembly shop of the Kolomna Production Association. Its destination is the Leningrad-Warsaw Locomotive Depot. From there it will take passenger trains on the Leningrad-Tallin sectors. Thousands of workers and specialists gathered to see off the steel hero of the day. A symbolic key was handed to the engineers A. Klochkov and A. Magdin who began to work on the first locomotives of this model. TEP-60 diesel locomotives have given a good account of themselves on the railroads of Siberia, the Far East, and Central Asia. They are reliable and economical to use. The association's collective is now beginning the series production of a new diesel locomotive -- the TEP-70. [Text] [Moscow IZVESTIYA in Russian 16 Sep 79 p 1] 2959

NEW HEAVY RAIL TRANSPORTER--Voroshilovgrad. A railroad transporter for carrying especially heavy energy, chemical, metallurgical, and other equipment with a weight of 500 tons has been built at the Diesel Locomotive Plant imeni the October Revolution. This is the first 500-tonner in our country. Incidentally, like its less powerful colleagues -- transporters with a capacity of from 55 to 400 tons -- the giant was developed by skilled plant workers (chief designer -- A. I. Konstantinov).

Especially strong steel for the mechanism was made at the Orsko-Khalilovsk Metallurgical Combine, and specialists from the Kiev Institute imeni Paton took part in developing the welding technology for the elements. The new carriage for the heavy carrier is a complex structure of more than 60 meters long which has 32 axles. The transporter is equipped with a hydraulic control system and with mechanisms for rapid loading and unloading work. The 500-tonner has been handed over to its client -- the Ministry of Railways. [Text] [Kiev RABOCHAYA GAZETA in Russian 28 Jul 79 p 1] 2959

BAM ELECTRIC POWER--The first poles of a new electric transmission line have been installed on a tract of the Baykal-Amur line. The line stretches from Komsomol'sk-na-Amur to the important transportation junction of Berezovka. Energy will go along it from the Komsomol'sk Heat and Electric Power Station to the future station of Evoron, Gorin, and others, and also to timber worker settlements. [Text] [Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE KHOZYAYSTVO in Russian No 3, 1979 p 48] 2959

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